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CHARLES DEADY, M. D., EDITOR.

ASSOCIATE EDITOR:

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CHARLES DEADY, M. D.

ASSOCIATE EDITOR,

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I. A NEW PROCEDURE FOR PREVENTING REATTACHMENT OF THE LIDS TO THE GLOBE AFTER OPERATION FOR SYMBLEPHARON, WITH REPORT OF A CASE.—II. A CASE EXHIBITING A REMARKABLE DEGREE OF HYPERPHORIA. CONDITION RELIEVED BY OPERATION.

BY JOHN MONRO BANISTER, A. B., M. D., FORT
LEAVENWORTH, KAS.

I. All oculists are well aware of the great and often insurmountable difficulty met with in the attempt to prevent the reattachment of the lids to the eyeball after the separation of the adhesions in operating for symblepharon, and any method of surgical procedure which will secure the permanent separation of the formerly adherent structures is greatly to be desired. I believe that such a method has been devised, and one, too, which is so simple and effective that the wonder is that it was not thought of, and applied in practical ophthalmology, many years ago. Teale's method of covering the raw surfaces with flaps of healthy conjunctiva, the transplantation of rabbit's conjunctiva, and the grafting of mucous membrane from the patient's mouth are methods with which we are all familiar. We also know that such methods are tedious, and most likely to result in failure in many cases. The method which I

shall present in this paper is by no means original with me, but was devised by Kenneth Scott, F. R. C. S., of Cairo, Egypt, published in *The Lancet* of July 31 last, and referred to briefly in the last number of *Annals of Ophthalmology*, in which journal I first saw mention of it. Scott's case was one of union between the upper lid and cornea, the two being "firmly adherent." After separating the adhesions throughout the entire extent of the union, he passed fine silver wire sutures through the lid near its ciliary margin, everted the lid and sutured it to the eyebrow, with the cutaneous surfaces in contact. The denuded areas being thus held apart, cicatrization progressed uninterruptedly, and by the fourth day was complete over both detached surfaces. The sutures were then removed, and the lid released from its unnatural position. A perfect result was secured. At the time of seeing the reference to this case, I had under my charge an instance of aggravated symblepharon, and was undecided as to what operation I should select to remedy it, or rather *to try* to remedy it, for I had small hope of attaining success in a curative way. The method adopted, and the complete success following its use in the instance noted, determined me to attempt the same line of treatment in my case. I shall now give a brief history of this case, and describe the method of procedure :

Mr. J. W. O. of Leavenworth, Kas., a painter by trade, was examined by me during the latter part of October, 1897, at the request of his family physician, who had been treating him for a long time for an old trachoma affecting both eyes. I found the lids of both eyes in the classical condition characteristic of old and inveterate trachoma, there being also marked pannus on both sides. The patient had for many months been unable to follow his trade on account of his ocular condition, and, as there appeared to be no prospect of improvement under medical treatment, I advised, as a last resort, the performance of "grattage" in the case of each eye. I performed this operation on both sides on November 4. Explicit directions concerning the after-treatment were given, which, however, were not followed, as the

family physician, who was to remain in charge of the case, was unable to attend to the patient for two days after the operation. When I next saw him, several days after the "grattage," I found an extensive symblepharon of the right eye, the upper lid being firmly adherent to the upper two-fifths of the cornea and to the globe above the cornea for a considerable distance back toward the conjunctival fornix. The lower, unattached portion of the upper lid completely covered the pupil, and the adhesions between lid and globe were so firm and extensive that the eyeball was fixed, and could not move in harmony with its fellow.



Under the circumstances I decided to wait until the cicatricial union had become complete and the eye quiescent, and then to make an attempt to secure a permanent separation of the newly adherent surfaces. A few days before the time decided upon for the operation just mentioned, I read the reference to Scott's case, and immediately resolved to practice his maneuver. On November 24, 1897, I operated, as follows, under general anæsthesia, the latter being necessary owing to the extremely nervous condition of the patient. The adhesions were carefully separated, in the usual manner, and a canthotomy performed to

secure complete relaxation of the upper lid. I then passed two silkworm-gut sutures through the entire thickness of the separated lid, entering the needles on the conjunctival surface about three mm. above the ciliary margin. The skin supporting the eyebrow was then grasped between the thumb and forefinger of the left hand, and the upper end of each suture, still armed with the needle, passed through the fold of skin so formed. The accompanying diagram shows the method of passing these sutures.

Upon everting the lid and tying these two sutures, the ciliary margin of the former was fastened temporarily to the eyebrow, with the cutaneous surfaces in contact, and the conjunctival surface of the lid to the front. Thus the denuded areas on the lid and globe, respectively, were held well apart, and reattachment rendered impossible. No attempt was made to cover the raw surface on the globe above the cornea. After securely anchoring the everted lid to the eyebrow, as above described, a gauze pad thickly coated with vaseline was laid upon the lid and unprotected globe, and held in place by a loose bandage. Directions were given for the instillation of oil at regular intervals, and for the frequent change of the vaseline dressing, as well as for the periodical irrigation with warm solution of boracic acid, 4 per cent. The patient, to my surprise, did not suffer any special inconvenience in consequence of the false position of the lid, and in four days the raw surfaces had healed, and the lid was released and brought down into its proper relation with the globe. This case has been a perfect success. Not only has the symblepharon been cured, but the vision also, in each eye, has greatly improved in consequence of the *grattage*. The patient now reports himself as being "the happiest man in Leavenworth," which I mention as an earnest of the success attained in this seemingly hopeless case. I was assisted in this operation by Drs. S. B. Langworthy of Leavenworth, Kas., and W. F. Lippitt of the U. S. Army. The only change which I made in Scott's method was the performance of the canthotomy, which I think an advantage. Why the symblepharon should have resulted in the one eye from the *grattage* I am unable to say, as I was extremely careful to avoid touching the globe with the brush while rubbing the scarified lid.

Remarks.—1. In operating for symblepharon it is evident that any of the usual expedients for covering the raw

surface on the globe can be utilized as adjuncts to the temporary suturing of the everted upper lid to the eyebrow, or to a *similar fastening of the lower lid to the integument of the cheek*, in case the adhesion should involve the lid just mentioned. Thus, the conjunctiva, if healthy, can be loosened on either side of the denuded area, and, if the latter is not too extensive, the two flaps so formed can be drawn over it to meet each other, and be sutured in this position; or, if this should not be possible, flaps of conjunctiva, formed as in Teale's method, can be utilized; or, finally, grafts of mucous membrane from the patient's mouth can be made to do good service, especially if care be exercised to remove only the epithelial layer as advised by Dr. H. Gifford.* The first method should be selected when the loss of tissue has been small, or moderate, while the last would be indicated by preference in cases of more extensive denudation of the globe.

2. During the discussion following the recent report of this case to the Midland Ophthalmological Society at Kansas City, Mo., the point was raised as to whether the separation of the lid from the eyeball for four or five days would be likely to result in harm to the cornea. I do not think that we need in any case fear the least trouble on this score. It is true that in experiments upon animals the cornea is likely to suffer when paralysis of the orbicularis palpebrarum muscle is caused by division of the seventh, or facial, nerve. This is very easily explained when we remember that this paralysis destroys the power to wink, by means of which function the lachrymal secretion is smeared over the cornea and conjunctiva, and foreign particles which have found a lodgment on the cornea and in the conjunctival *cul-de-sac* are removed. As a result the cornea and conjunctiva become dry, and the former is scratched and irritated by the sand, dirt, or other foreign bodies which fall on the unprotected globe. This irritation is increased by the animal's instinctive attempt to rub the offending particles from their resting place, for the

* See *The Ophthalmic Record*, December, 1897.

fifth nerve being intact, the sensibility of the eye is as great as ever. As a result of this irritation and scratching of the cornea, the door is opened for mycotic infection, with loss of the eye from corneal ulceration. This does not happen, however, in the case of facial paralysis in the human being, when the eye is protected and kept moist; and no trouble will result when the lids are temporarily separated from the eyeball, as in the operation for symblepharon, if the eye is dressed as described in the above report. The trophic condition of the eye will not be in the least degree interfered with, and the cornea will be thoroughly protected from mechanical injury and prevented from becoming dry.

3. I heartily recommend this method to any oculist having an unpromising case of symblepharon on his hands, for I feel sure that he will meet with the same success that followed its use in my case, which, I think, must be the first instance of its employment in this country.

II. Mr. A. J. P., twenty-six years of age, a bookkeeper by occupation, consulted me on March 29, 1896. He complained that his eyes felt tired after a long day's work over his books, and stated that he thought that there was "something wrong with them."

Upon inspection the eyes looked natural, and seemed to be properly directed. Vision in each eye was above $\frac{20}{20}$. With the phorometer, and supplemental square prisms, there was discovered a *right hyperphoria* of 16° for distance. Upon looking at his right eye behind the slide of the phorometer containing the prisms the right cornea was found to be directed upward in a marked degree. Upon removing the instrument the upturned eye would at once assume the proper direction, and single vision be regained. The examination was continued the following day under the cycloplegic action of homatropine hydrobromate and cocaine, the gelatine discs containing $\frac{1}{10}$ grain of each of these drugs being used, with the result of unmasking a slight degree of hypermetropic astigmatism in each eye. With the phorometer, while under the influence of the cycloplegic, *the hyperphoria was found to be 20°* . Thus, during cycloplegia, 4° more of error had become manifest. There was no doubt whatever on this score ;

I examined again and again at this sitting with the phorometer and supplemental square prisms, and left no room for error. Upon April 4, 1896, the fifth day following, I tested the muscular action in the vertical plane with the following result:

- O. D. $\left\{ \begin{array}{l} \text{Sursumduction } 9^{\circ} \text{ (Prism).} \\ \text{Deorsumduction } 2^{\circ} \text{ (Prism).} \end{array} \right.$
- O. S. $\left\{ \begin{array}{l} \text{Sursumduction } 2^{\circ} \text{ (Prism).} \\ \text{Deorsumduction } 20^{\circ} \text{ (Prism).} \end{array} \right.$

I ordered for the patient a pair of lenses, correcting the slight amount of astigmatism present, combined with a prism of 2° , base down, for the right eye, and one of 2° , base up, for the left eye, and informed him that an operation, possibly two, would be required in a short while. The patient returned on June 27, 1897, nearly fifteen months afterward, complaining that his eyes were giving him decided trouble again, especially after any unusual amount of work over his books, which sometimes required close attention for *fourteen hours out of the twenty-four*. He did not suffer from double vision, and never had. Since the use of the prisms more of his latent hyperphoria had become manifest and he now exhibited 26° of *hyperphoria for distance*, this being an increase of 10° over the amount first discovered in March, 1896. There was now also a change in the sursumduction and deorsumduction in each eye, thus:

- O. D. $\left\{ \begin{array}{l} \text{Sursumduction } 25^{\circ} \text{ (Prism).} \\ \text{Deorsumduction } 0^{\circ} \text{ (Prism).} \end{array} \right.$
- O. S. $\left\{ \begin{array}{l} \text{Sursumduction } 1^{\circ} \text{ (Prism).} \\ \text{Deorsumduction } 22^{\circ} \text{ (Prism).} \end{array} \right.$

I now earnestly advised operation, to which the patient willingly consented. Upon July 7, in the presence of Drs. W. F. Lippitt of the U. S. Army and W. Walter of Leavenworth, his family physician, I tested the vertical imbalance immediately previous to operation, and found it as follows: Distance, *right hyperphoria* = 26° ; near, *right hyperphoria* = 26° . I then, under cocaine anæsthesia, performed a complete tenotomy of the *superior rectus muscle* of the right eye, which immediately reduced the hyperphoria, as tested at the operating table, to about *one-half* of its former amount. I was assisted at this operation by Drs. W. F. Lippitt and Basil H. Dutcher of the U. S. Army. Three weeks later there still remained a *right hyperphoria* of 14° for

distance. I then, with the assistance of Dr. Dutcher, performed a complete tenotomy of the *inferior* rectus of the *left* eye, with the result, upon immediate testing, of bringing the distant candle flames *about* on a level during the production of artificial lateral diplopia. Upon August 6 last there was a hyperphoria of 1° still remaining, and the same comparatively slight degree of error was found when the patient was last examined, on October 2. After these operations the prismatic correction was removed from his lenses, and the patient has ever since been performing his exacting work with comfort.

I feel constrained to place this case upon record, on account of the remarkable degree of typical hyperphoria present, which be it remembered, was not a bar to most exacting use of the eyes in bookkeeping, and wish as well as to direct attention to the excellent result following the double complete tenotomy of the overacting, antagonistic superior and inferior recti muscles, respectively, of the two eyes.

NOTE.—The first case was presented to the Midland Ophthalmological Society at Kansas City, Mo., on December 13, 1897; the second was presented to the same society on October 11, 1897.

ACUTE AND CHRONIC INFLAMMATION OF THE NASAL ACCESSORY CAVITIES.

BY THOMAS L. SHEARER, M. B., C. M., EDIN.,
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DURING the past winter months catarrhal affections of the upper air passages have been so numerous, and the symptoms in many instances so varied in their character, that a study of some of the most characteristic features observed in these cases might be interesting as well as profitable to us. As it is clearly impracticable, even if desirable, to consider many of these diseased states in this short paper, it seemed best to select only those pathological conditions which are included under the head of acute and chronic inflammation of the nasal accessory cavities, particularly as discharges from these regions are so frequently a cause of erroneous diagnosis, and consequently contribute toward a failure in the treatment of what may be judged to be an ordinary simple nasal catarrh or even an ozena. In order to comprehend our subject clearly, it is best to refresh the memory by making a few preliminary statements concerning the anatomy of the parts involved. The cavities which open into the nasal chambers are, on each side:

- (a) The Antrum.
- (b) The Frontal Sinus.
- (c) The Anterior and Posterior Ethmoidal Cells.
- (a) The Sphenoidal Sinus.

All of these cavities are lined with mucous membrane which is continuous with that of the nose, but it is much

less vascular, and is covered with ciliated epithelium. The membrane in the cavities contains glands, which seem to be most numerous in the antrum, and are apparently capable of giving any amount of trouble. On the outer wall of each nasal chamber, the three turbinated bones are located, one above the other, and over them the mucous membrane is thrown in folds; thus diminishing to a considerable degree the space in the cavity, and at the same time forming the passages between the turbinate membranes, called the upper, middle, and inferior meatuses. The inferior meatus is overhung by the inferior turbinated bone and its membrane, and into this space, about one-quarter of an inch from its anterior extremity, opens the slit-like aperture of the lachrymal canal or nasal duct. If the middle turbinated bone be removed, and thus the middle meatus be exposed, we observe a curved fold of mucous membrane which bounds a groove anteriorly and which ends in front in a small opening called the infundibulum, through which a probe may be passed upward into the frontal sinus. The frontal sinuses are cavities which are situated between the two plates of the frontal bone, and they correspond in their location to the external prominences above the orbits. They are usually divided by a partition near the middle line, but sometimes there is only one cavity which is common to both sides. They are lined by mucous membrane that is continuous through the infundibulum with that of the nose. The antrum, or cavity in the upper jaw, extends from the floor of the orbit to the roof of the mouth. It is very important to remember that the floor of the antrum is not above the hard palate, for all this goes to form the floor of the nasal chambers, but above the alveolar border as far as the outer side of the canine tooth. The prominence around the socket of this tooth is just under the partition between the nasal cavity and the antrum. Except at the point of the malar tuberosity and below, the antral walls are as thin as paper. The roots of the bicuspid and molars are implanted in the floor, and removal of one of these sometimes causes an opening

without subsequent puncture. The openings of the antrum into the nose are sometimes one, at other times two, in number. One of them always opens into the infundibulum, leaving the antrum just under its roof, and is, of course, unable to drain it. This opening is sometimes single in the antrum and double in the infundibular end. There is also occasionally an opening of the antrum lower down and farther back in the middle meatus. The superior turbinated bone forms but a slight ridge in the posterior and upper part of the nares, below which is the upper meatus. Into this open, by a small passage, the posterior ethmoidal cells, which are included in the posterior half of the upper lateral masses of the ethmoid. They vary in size and number. They are internal to the orbit and below the base of the skull, and in front of the sinus in the body of the sphenoid. They are separated by a constant partition from the anterior ethmoidal cells. Behind are the sinuses in the body of the sphenoid, which are separated by a partition invariably on one side of the middle line. They lie under the sella turcica and extend to the front of it. They open each by a small opening into the posterior part of the roof of the nasal fossæ. Thus the mucous membrane of the nose is continued into the frontal sinus, the whole cavity of the upper jaw, and the cells of the ethmoid and sphenoid bones. When one bears in mind these anatomical points, it is very easy to understand how inflammatory processes originating in the nasal chambers can extend to any or all of the accessory cavities; and also how any congestive or catarrhal conditions in the nose, by extreme turgescence of the mucous membrane, could interfere with the free drainage of these same sinuses.

1. The *acute inflammatory conditions* affecting the adjacent nasal cavities are always associated with a similar kind of disturbance in the nose itself, and, in fact, are usually produced by a simple extension of the pathological process from the latter to the former locality. There are three classes of cases in which the acute symptoms are present:

(a) One in which an ordinary acute coryza develops with sneezing; a sense of nasal stuffiness; profuse watery discharge; a well-marked throbbing, or a dull headache referred especially to the region of the frontal sinuses, sometimes to the vertex or to the occiput, and often aching in the neighborhood of the upper jawbone, with a sensation of elongation of the teeth—a feeling as if they were to long for their sockets when the teeth in the upper and lower jaws were pressed together. Beyond a doubt, these symptoms represent an acute congestion, involving the mucous membrane which lines the nasal chambers and also the frontal sinuses, the ethmoidal cells, and the antral sinuses, respectively. If the attack be a light one, or if the proper remedies be administered early enough, the symptoms subside very promptly without much more nasal discharge, or else the secretions, becoming thicker in consistence, gradually dwindle away.

(b) If the patient contract several head colds, one upon the other, before convalescence from one of them is complete, or if the patient be subjected to draughts of cold air, to unusually severe atmospheric changes, particularly when he possesses that peculiar susceptibility of the system to catarrhal troubles known as the catarrhal temperament, and, above all, when epidemic infectious catarrhs are as abundant as they were this winter, then we are almost certain to find a marked difference in the symptoms as compared with those just enumerated under the first variety. In some of these cases prolonged and intense pain in the frontal sinus (or, more rarely, in the region of the antrum—usually only on one side) is complained of, and is of three types: (1) throbbing or tearing, (2) stabbing or shooting pain, (3) paroxysms of pain coming and going like a wave with a crescendo toward, and a decrescendo from, a climax of intensity. This last variety of pain—neuralgic in character—was only present in some of the cases under observation, while the other kinds of pains were common. The frontal region was most frequently affected. The symptoms are not accompanied by sneezing, as a rule, and are only inclined

to disappear as the profuse discharge, which is thick and yellow when first observed, makes itself evident, and at the same time allows the tension under which it has been kept in the frontal and antral sinuses to subside. It is nearly always noticed that the Eustachian tubes are affected in these cases of severe acute catarrh, and annoy the sufferer by giving rise to sensations as of a plug of cotton in the ears, tinnitus aurium, and at times varying degrees of temporary deafness.

(c) In cases where a severe acute catarrhal condition was present involving both nasal chambers, with impairment of taste, smell, and hearing, there was very little pain complained of, merely a dull, heavy feeling—a stuffed sensation throughout the head, and as the discharge, thick and yellow, was rather profuse *from the onset* of the symptoms, there was reason to think that, while the mucous membrane lining the accessory cavities could hardly be expected to escape all inflammation, it was at least not implicated sufficiently to secrete freely and thus give rise to pain.

As regards the *treatment* of the conditions already described, it is only necessary to say that as every physician has his own method of treating the ordinary acute coryza, I shall only mention several remedies that have in most instances given prompt relief. They are *allium cepa*, *aralia racemosa*, *arsenicum*, *arsenicum jodatum*, *mercurius vivus*, *natrum arsenicosum*, *natrum muriaticum*.

When, however, we have to deal with a class of cases as described under the *second* variety of acute catarrhal affections, there are some special points in the treatment which may be mentioned. When the throbbing and pain in the frontal region are very intense, great relief may be obtained by applying over the entire forehead a piece of flannel wrung out of boiling water, covering this with a dry piece of the same size, and over this placing a sheet of oiled silk so as to cover the flannel layers. A small roll of narrow tape around the head is used to keep everything in place. These dressings should be renewed every two or three hours until the pain begins to subside, when it is sufficient

to change them once in, say, four hours. When the frontal pain is entirely relieved, remove the flannels and the oiled silk, bathe the forehead with cool water, and quickly rub dry with a coarse towel. This prevents any risk of taking cold after suddenly uncovering the parts. The internal remedies that render excellent service are : magnesia phos. 6x or belladonna, for the shooting or throbbing pain ; stannum met. 6x, for wave paroxysms, as previously described ; mercur. jodat. flav. 2x, when the yellow discharge makes its appearance and to relieve the Eustachian symptoms ; merc. jodat. cum kali jodat. 3x, for steady-tearing, one-sided frontal pain before any discharge has taken place, which, by not yielding easily to the first remedies, shows that the frontal sinus is the seat of an acute suppurative process. A rhinoscopic examination of the affected nostril reveals the discharge coming from the middle meatus and confirms the diagnosis.

If, again, the conditions are those mentioned under the *third* variety of acute catarrhal attacks, one may daily cleanse the nasal chambers of their purulent secretions with Seiler's solution, and then, by means of a globe nebulizer driven by the compressed air apparatus, apply a soothing vapor through the nostrils in alternation, under sufficient pressure to insure its penetrating even to some of the cavities. A useful formula for this purpose is :

R	Camphor.....	4 parts
	Menthol.....	4 parts
	Acid Carbolic.....	2 parts
	Lavolene (Albolene).....	90 parts

While at all times indications should be considered, it might be well to give apocynum cannabinum 3x, lemma minor 6x, pulsatilla 3x, or kali sulph. 6x a trial in these cases.

If in any of these instances a persistently engorged condition of the nasal mucosa exists, with an obstinate excessive proliferation of the epithelial layers, whose broken-down cells and leucocytes form a large part of the purulent discharge, the following local treatment will greatly assist the action of our internal remedies : First apply a four per

cent. solution of cocaine hydrochlorate to the nasal cavities, either by means of the spray or on a piece of cotton wrapped around the end of an aluminum wire, which, for convenience, may be six inches in length. If the solution is sprayed, it is best to request the patient to hold the head well down and forward, so that no cocaine can find its way into the nasopharynx and thence, by being swallowed, reach the stomach and produce toxic symptoms. If it is carried into the nostrils on the cotton applicator, care should be taken to have no excess of cocaine on the cotton, for the reasons just now mentioned, and after the use of the solution the patient should be immediately directed to incline the head forward for a minute or so, then to clear the nasal cavities of all secretion by the liberal use of the handkerchief. Next a piece of cotton on the wire applicator is dipped into an iodine solution and, after removing any excess of the liquid by pressing the cotton gently against the mouth of the solution bottle, it is applied all over the turbinate membranes in both nostrils (if they are similarly affected) as far back as the posterior wall of the pharynx near the vault. Sneezing and a free discharge of a rather thin, serous character often result, with contraction of the engorged tissues and liquefaction of the previously heavy, thick discharge. Two or three treatments are usually all that are necessary in the cases of average severity, and they may be given twice a week; if the secretion is very profuse and thick, every other day for a few days, until improvement sets in, will give relief. We have given these minute practical details, because if they are not properly carried out, disappointment in the termination of the cases is apt to follow the use of this useful method. An excellent formula for the solution to which we have just referred is:

R	Iodine crystals.....	grs. viii
	Potassium iodide.....	grs. xxxviii
	Glycerine.....	viss
	Misce.	

It is needless to say that such applications are of no use whatever in cases of frontal or antral empyema, unless we

find a coexisting condition of the nasal mucous membrane itself, as described above, or a localized tumefaction of the mucous membrane about the apertures which drain these cavities; in the latter instances the iodine-glycerine solution reduces the orificial swelling and assists drainage. An accurate diagnosis of the nature and origin of all nasal discharges is of the greatest importance, as the treatment of an empyema and of a simple purulent rhinitis must necessarily differ widely. In some instances, a persistent discharge of pus, from one nostril only, may be traced to an acute ethmoiditis, and on careful examination of the parts, we will see the swollen condition of the middle turbinate membrane, with increased sensitiveness to the pressure of the probe; at times severe pain is referred to the root of the nose or located high up on the side of the head corresponding to the region affected. It appears, however, that such acute cases of ethmoiditis are seldom seen, and, when they do occur, are rarely discovered until the chronic state results, and then surgical measures are often necessary. We observed one instance this winter, in a man, *æt.* seventy years, who suffered from a catarrhal condition of all of his mucous membranes. He had, within a space of three days, developed a most violent attack of acute ethmoiditis, with enormous swelling of the right middle turbinate membrane, which was bathed in a discharge of creamy yellow pus; inability to breathe through the affected nostril and an extreme degree of melancholia were marked features. This pathological state had, from his previous history, no doubt supervened upon a chronic empyema of the ethmoidal cells, and seemingly presented the features of a simple acute case. The snaring off of the cap of the turbinate, with careful curetting, resulted in the free evacuation of offensive pus and some necrosed tissue, which could not have come in so short a time.

II. The symptoms of acute frontal or acute antral empyema are usually so marked as to admit of no question concerning their existence. When, however, we have to decide as to the origin of a purulent nasal discharge in some of the

cases of chronic empyema there are many instances when all of our diagnostic abilities will be taxed to form an opinion. Pus, at times, has an ugly way of getting all over parts of the nasal mucous membrane, and it seems to start from different regions in the most perplexing manner. It requires a great deal of patience to locate it in such conditions, especially when several cavities—as the frontal and the antral, or the frontal and the anterior ethmoidal cells—are simultaneously involved. Of the chronic empyemas, we find that suppurative processes are more likely to occur in the antrum of Highmore and the frontal sinus than in the ethmoidal cells, and least of all in the sphenoidal sinuses. The *antral* variety is more commonly met with, because of the relationship existing between it and some of the teeth in the upper jaw and because of its connection with the nasal cavity. A carious condition of the first molar tooth with an abscess at its root is readily capable of causing antral suppuration, while a diseased state of any of the upper-jaw teeth can give rise to the same trouble. It is impossible to tell just what proportion of cases is produced by dental and by nasal irritation, as no statistics upon the subject have been collected. And now as to the various points which are usually depended upon for diagnosis. These are:

- (1) Rhinoscopic examination.
- (2) Transillumination.
- (3) Examination of the teeth.
- (4) Special symptoms.

(1) The rhinoscopic examination should be made to determine whether any particular change in the turbinate membranes is perceptible; to see if any trace of pus is present, and, if so, to endeavor to follow it to its source. In the case of antral suppuration pus will be observed in the middle meatus, but it also occurs in this locality when the frontal sinus or the anterior ethmoidal cells are similarly affected. To distinguish between them, wipe away the purulent secretion with a dry piece of cotton on a probe, and instruct the patient to lean the head down between

the knees and toward the healthy side for a few moments. If, on examination of the nose after this, pus is again found only in the middle meatus, it is indicative most probably of antral suppuration; but we must, however, bear in mind that the discharge may come from either of the other two regions, although when the ethmoidal cells are involved the pus is also seen on the septal side of the middle turbinate membrane, and, finally, antral and ethmoidal disease may coexist, in which case the pus may be found in both localities. While it is necessary to discover the exact region from which the discharge comes, we must not rest our diagnosis upon that one point alone, but proceed to the next method of research, viz.:

(2) *Transillumination of the face*.—In order to do this, we place a dark cloth over the heads of the patient and the surgeon, so as to exclude all extraneous sources of light, introduce an electric lamp of, say, eight to ten volts, in the patient's mouth, and turn on the current. As the bones of the face are more or less translucent, the rays of the lamp illuminate the face. A comparative opacity will be noticed below the orbital notch on the side of the face which contains the pus, for the presence of the latter renders the part less translucent than that of the healthy side. If the light be interrupted frequently and suddenly, flashes will be seen by the patient with the eye on the sound side, or at least, better than with the eye upon the supposed unhealthy side. Valuable as this diagnostic test may be, we must mention one or two things by way of caution, viz.: (a) If the empyema exists in both antral cavities; (b) if the bones happen to be more opaque than usual; (c) or, finally, if the power of the lamp is not sufficiently strong, we must make our deductions accordingly, or we will most certainly be led astray in our diagnosis. However, when all the conditions are favorable for the test, transillumination is a most useful adjunct in locating the pus.

(3) *Examination of the teeth*.—It is best to apply light blows upon the crowns of the teeth of the upper jaw upon

the side which is supposed to be diseased, particularly those that have been plugged, filled, or capped, and especially to study the condition of the first molar. A tooth may have a dead pulp and a resulting alveolar abscess, and yet not be in a carious state. There can be no doubt that neglect of the teeth has caused many an antral empyema. While it is a good rule to suspect disease in any single tooth, which upon receiving light blows from, say, a steel probe, gives evidence of extreme sensitiveness, and which upon careful inquiry affords a possible history of dental abscess; yet we must not forget that such symptoms may be merely indicative of local neuralgia, either the result of exposure to cold or else the expression of a generally run-down condition.

(4) *Special symptoms.*—These include pain, which is usually of an intermittent type, in the region of the antrum; sensitiveness of the face to pressure: gums often swollen, and the roof of the mouth at times tender, with occasional swelling of the part. All of the teeth on the affected side are at times sensitive to the taps of a steel probe or other instrument, and in some instances feel elongated. We shall not dwell here upon the medicinal treatment or upon the methods of evacuating the pus, as they are familiar to us all, but merely mention one point about entering the antrum through the cavity of an extracted tooth by means of the dental engine burr, viz., the fact that when possible we should select the *anterior buccal socket* of the tooth through which to perforate, and not the *inner* or *palatine* socket, as we are liable, by using the latter, to send the burr through the floor of the nose instead. A careful study of many cases of acute and chronic nasal affections justifies us, we think, in coming to the following conclusions:

(a) That a good proportion of the acute coryzas as well as the acute exacerbations of the chronic cases are apparently, in the light of our present knowledge, caused by disturbances of those chemical processes which daily normally occur in the human body.

(*b*) That while exposure to sudden changes in the temperature may and does produce contraction of the cutaneous blood vessels, and consequent engorgement of those internal vessels, which from inherent weakness dilate easily, yet this element is merely a factor in inducing catarrhal states, and not the principal cause.

(*c*) That we should therefore, in each case, look chiefly for internal and less for external reasons, when we are treating patients who suffer from repeated attacks of such troubles.

(*d*) That the convenient and sweeping cause,—“catching cold,”—like its dilapidated friend malaria, will some day be relegated to its proper place as a recognized factor in disease; in other words, the effect of draughts of cold air, etc., depends upon the intrinsic state of the individual and not upon any special power of its own.

(*e*) That where an acute catarrhal attack does not terminate in a reasonable space of time, we should examine the nasal chambers carefully to determine, if possible, the source of the discharge—whether merely nasal or from an accessory cavity. This is, at times, not easy to carry out satisfactorily, but we can at least try.

(*f*) It is a good rule, in frequently recurring cases or in chronic ones, to ascertain as far as possible the daily habits of our patients; the nature of their food, the kind of underwear worn, the general clothing, the temperature and kind of bath, etc., for upon any or all of these points may depend our success or failure in treatment.

(*g*) In chronic catarrhal states, that do not yield readily, even to persistent local and internal remedies, we are almost certain, elsewhere in the body, to find some cause, as excessive menstruation, gastric catarrh, constipation, general catarrhal condition of all the mucous membranes, or some underlying constitutional weakness. In other words, the most successful specialist will be the man who does not consider each of his patients as merely possessing a head with eyes, ear, and throat, supported by the necessary pair of legs for locomotion, but the one who views these local diseased conditions as indices to the general state of the system and treats his subject accordingly.

A CLINICAL CASE.

BY ROBERT CARR BLOCK, M. D., ST. LOUIS, MO.

MR. J. I. C., aged forty-five, consulted me eighteen months ago, with a history as follows: Two years previously he had suffered a severe attack of la grippe, complicated with acute inflammation of left side of face, excessive pain over the entire area, and profuse watery discharge from the left nostril. The acute symptoms subsided, but the discharge persisted, assuming a purulent form. He fell into the hands of a so-called specialist, who treated him in the routine way for two years, without benefit—save to the specialist.

I found Mr. C. suffering with a condition of general malaise, much mental depression, and lack of physical vigor. Examination revealed the presence of a small amount of light yellow pus in the left middle meatus, which, upon wiping away, and inclining the head to the opposite side, reappeared. The anterior portion of the middle turbinate was hypertrophied and impacted, the first molar tooth decayed, and there was a sensation of tenderness upon percussing same.

Transillumination of the face with Heryng electric lamp showed marked dullness of the antral region on the affected side, in marked contrast with the opposite. Removal of the anterior portion of the middle turbinate was decided upon and done, to give better drainage and permit entrance through the ostium maxillare into the antrum. By the use of a four per cent. solution of cocaine, I succeeded in introducing an olive-shaped syringe point of small caliber,

and injected a few drops of hydrogen peroxide; a profuse discharge of white foam followed withdrawal of the syringe. This treatment was repeated daily for two weeks, and being satisfied of the necessity of better irrigation and drainage, (the location of the maxillary opening above the floor of antrum preventing natural drainage), the first molar tooth was removed, and an opening with dental engine and drill effected through the alveolar process. A free injection of peroxide of hydrogen developed the presence of a large quantity of decomposed and fetid pus, and confirmed my opinion of the futility of treatment through the natural opening.

A platinum canula was inserted, and retained *in situ* by plate attached to adjoining molar tooth. The fetor subsided promptly under the influence of hydrogen peroxide and permanganate of potassium. The treatment thereafter consisted of mild alkaline solutions forced through the antrum under high pressure, to insure thorough cleansing of all the surfaces, followed by a current of warm air to thoroughly dry the cavity. The diagnosis at this time was empyema of the antrum, but a few weeks of treatment developed the fact that for several days there would be no pus in the cavity, and again a quantity would come away under irrigation. This led me to suspect that the pus formation was from another source; the close proximity of the orifices of the frontal anterior ethmoidal and antral sinuses opening into the middle meatus might readily permit pus drainage into the antrum from either of the other cavities.

By careful probing access to the frontal sinus was obtained, and an injection of peroxide developed the presence of pus in quantity. To facilitate drainage and treatment the caliber of duct was increased by the use of a drill of proper curvature, to a diameter of $\frac{3}{16}$ of an inch; a large rubber ear catheter, curved at the end to 90°, was easily introduced, and served admirably in conducting the future treatment of case. As a precautionary measure to prevent accumulation of pus in the antrum, the alveolar drainage

tube was allowed to remain, but I will remove it at an early date, as there has been no evidence of pus in the nasal cavity for the past two months.

Among the internal remedies employed, silicea and pulsatilla seemed to be the most effective. The point of interest in this case is whether or not the maxillary sinus was involved, further than being a receptacle for a portion of the pus drainage from the frontal sinus. I think not.

ADENOID GROWTHS IN THE VAULT OF THE PHARYNX, AND THEIR RELATION TO DISEASES OF THE MIDDLE EAR.

BY HAL FOSTER, A. B., M. D., KANSAS CITY, MO.

D R. MEYER of Copenhagen, Denmark, in the year 1868 first called the attention of the medical profession, in a very exhaustive and convincing paper, to the adenoid tissue in the vault of the pharynx. In this paper he pointed out their relation to middle ear disease. His able paper has been followed by many subsequent workers in this important field, who have been amply able to confirm his observations by abundant clinical experience. Dench, in his recent work, justly states that adenoids in the vault of the pharynx are undoubtedly responsible for more than half of the pathological conditions seen in the tympanum. Clinical experience has proven this to be absolutely correct, in the minds of all careful and painstaking observers. Frequently these growths are the cause of deafness in children; the deafness is caused by a breaking down of this tissue, and pus finding its way by the Eustachian tubes to the middle ear, which sets up inflammation and suppuration. The deafness may be caused by obstruction at the orifice of the tubes, or extension of catarrhal inflammation into the middle ear by means of the tubes. In the first history of man it is written that in his nostrils was breathed the breath of life, showing conclusively that the nostrils were made for breathing purposes. Pathologists tell us that repeated nasal colds inflame these tissues, which finally become of a harder variety and the vault

becomes obstructed. The disease is much more prevalent in a cold, moist climate.

Some observers claim that the lymphoid tissue is very apt to be left inflamed as a sequela of scarlet fever, diphtheria, or measles, and the adenoids arise from these conditions. This may be, and often is, the exciting cause. Still, I have frequently seen children, perfectly healthy every other way, never having had any of the diseases of childhood, afflicted with adenoid tissue in the nasopharyngeal vault. A few observers divide post-nasal growths into more than one disease, that is, hypertrophy of the pharyngeal tonsil and adenoid vegetation. These I believe to be two forms of one disease situated at the vault of the nasopharynx of children.

The symptoms are so very characteristic that to overlook the disease is scarcely pardonable. These little patients are generally pale and weakly. The nostrils are pinched, and frequently the thorax will be drawn in. There seems to be a cold in the head. The voice is called "dead" by Meyer, because it is nasal, and is accompanied by discharge of muco-pus into the fauces. In other words, this condition gives rise to a train of symptoms which are mostly mechanical, and occur mainly in young persons. When the adenoids are sufficient in number and size, the entire vault becomes obstructed, and the mouth will be held open all the time. During the night these cases snore and breathe loudly. Their teachers at school consider them stupid and inattentive children. They take cold in their noses on the slightest change of temperature, and the nose will discharge mucus nearly all the time.

In fact, the child presents all the appearances of being exceedingly dull and stupid. The snoring and the mouth breathing are never due to habit, but to the obstruction of the nose, which forces the child to hold its mouth constantly open in order to breathe. The inattentive condition is brought on by the impairment of hearing, due to obstruction of the Eustachian orifices or catarrhal inflammation. In nearly all such cases there will be a history of

recurrent middle ear disease. It is exceedingly difficult for such cases to blow their noses. Dr. Meyer said that a deaf child who breathes through the mouth and has a thin compressed nose is affected with adenoid growths in the nasopharyngeal cavity. It is not necessary to wait until permanent deafness has resulted. When a child is inattentive at school, constantly breathes through his mouth, snores at night, is predisposed to bronchitis, and has a nasal and aural discharge, he should be examined by a skillful rhinologist for presence of adenoid tissue in posterior nares. This subject should be of interest to every physician who has to deal with children. This disease is much more common between the ages of two and fourteen years. It is a great deal of personal satisfaction to know that the ear is now not only viewed through the aural but the rhinoscopic mirror, and nasal septum as well.

Both Bosworth and Dench consider this subject very carefully in their recent works. It is sometimes called hypertrophy of the pharyngeal or Luschka's tonsil. In a few of these children, by great care and patience one will be able to see these growths by means of the mirror. The great majority of such cases will never allow a physician to insert a mirror, be it ever so small, into their mouths. In such cases the index finger may be inserted behind the soft palate in perfect safety, and these growths can be distinctly felt. In fact, a perfect diagnosis can be made by means of the index finger alone. The faucial tonsils are frequently enormously enlarged; they should be excised first.

The treatment may be divided into local and surgical. As a rule, the local treatment is of very little good. The application of chemicals and the galvano-cautery can occasionally be used successfully under local anæsthetics. In early childhood, when the growths are soft, they may be scraped off with the finger nail. In older children the adenoids are much harder, and it now becomes necessary to use forceps, snares, curettes, or cautery. I have seen a few operators have the little child firmly held by strong assistants, while these growths were rapidly removed,

amid screams and struggles. I could never resort to such cruel measures; the patients are badly frightened, and never like physicians afterward.

In my experience, the surgical treatment is by far the best and gives the most satisfactory results. Most every laryngologist has some special instruments such as snares, forceps, or curettes, that he is in the habit of using in these cases. That method only should be used which causes the least danger to the child, and which promises the very best results. If these little patients are otherwise healthy it seems that chloroform or ether should always be administered. It is never necessary to produce profound anæsthesia; only enough should be given to produce semi-narcosis. Everything should be ready before the anæsthetic is given, in order that the operation may be done quickly while the patient is only partially under the anæsthetic. It takes a few moments only to complete the entire operation; here rapidity is very necessary. As a rule, there is a great deal of blood lost during the operation, which, owing to its nature, is rather difficult to prevent. I always give my patients anæsthetics in the manner already described; much better and more rapid work can be done in that state.

The instruments are immersed in boiling water and every detail of the operation is done before the anæsthetic is given. The child is now placed on its back on the operating table; the head should be allowed to hang from the edge of the table during the operation, in order that the blood may flow from the nose and mouth. If the patient is a girl, her hair should be covered by oiled silk to protect it from the blood. O'Dwyer's mouth gag should be first inserted, well back on the left side, and firmly held by an assistant. The operator stands on the right side; his left forefinger is now inserted behind the soft palate as a guide for the curette, forceps, or other instrument that he may elect to introduce with the right hand. I always use the heart-shaped curette of Gottstein, and while in this condition very rapidly remove the adenoids from the vault of

the pharynx. The flow of blood is quite sharp and copious, but, as a rule, it soon ceases after the growths have been removed. During the operation it can be easily wiped out of the mouth by means of cotton or sponges. Immediately after the operation is finished, the gag should be removed and the patient turned on the side; being only partially under the anæsthetic, he will cough and spit out the blood, which otherwise might enter the larynx. You now see what my object was in giving only a very little anæsthetic: to have the assistance of the patient in keeping the blood from entering the larynx. It will be necessary to confine these patients to bed for a few days only. For about one week afterward there may be a little bloody discharge from the nostrils. A mild antiseptic ointment or spray should be used, which should always be pleasant and refreshing to such patients; this will constitute about all the after-treatment necessary.

In doing this operation it is well to always bear in mind how much harm and danger blood entering the larynx and trachea will cause. If the patient is only partially under the anæsthetic there will be absolutely no danger in that respect, because he will cough and spit it out. The operation is one which, when carefully done, is very apt to bring rapid and wonderful improvement. The hearing improves; the snoring and mouth breathing become things of the past; the stupid, inattentive condition disappears; in fact, the general health rapidly improves. There is absolutely no danger following it when done carefully. It will bring great satisfaction to the physician and save very many children from being deaf, by preserving countless drumheads and preventing troublesome middle ear disease.

THE FUNCTIONAL RELATIONS OF THE TWO EYES.—SIMULTANEOUS VISION, BINOCULAR VISION, AND ALTERNATE VISION.*

BY H. PARINAUD.

THE functional relations of the two eyes have heretofore been confounded with binocular vision. Now the first fact that must be understood is that there are two modes of vision with the two eyes, one that we may call *simultaneous vision*, the other *binocular vision* proper. Finally, the study of these relations includes also certain phenomena of alternation which are produced sometimes when both eyes are opened.

Simultaneous vision is more fundamental, more solidly established by inheritance. Binocular vision appears to us as a function the result of greater perfection; its apparatus of more recent date, in the order of philogenesis, is more fragile, more susceptible to the vices of development when the obstacles to its function exist in infancy. For the same reason, it is more susceptible of development by exercise, especially in young subjects.

It will be logical then to study first the fundamental apparatus of simultaneous vision, and afterward that of binocular vision. Nevertheless, for the sake of clearness of description, we will follow the reverse order. Binocular vision lends itself better to analysis; its apparatus is easier to define. Moreover, we find an affection which is essentially characterized by a vice of development of the apparatus of binocular vision, that is, strabismus. Stra-

*Translated by W. S. Pearsall, M. D., from *Annales d'Oculistique*, October.

bismus, in altering progressively the apparatus of binocular vision, will aid us in understanding its function, while in pulling down this apparatus we will be permitted to understand what simultaneous vision is and to define what constitutes its apparatus. It will be sufficient for this purpose to study the visual characteristics of strabismus, which do not act to any extent in binocular vision.

I. *Binocular Vision*.—Binocular vision has for its essential object the co-operation of the two eyes in the same sensation, thus rendering this sensation more perfect, more precise in what concerns its localization in space. For this co-operation the two eyes are associated in the brain in such a manner as to form, from a functional point of view, a single organ (a cyclopean eye).

Binocular vision is the function of a special apparatus, which we will proceed to define. This apparatus, like the general visual apparatus upon which it is developed, is composed of a sensory part, a motor part, and two bonds which unite the one with the other.

The sensory part is represented by the *particular connections of the retina with the cerebral visual centers*, destined to centralize their impressions; the motor part is represented by the *convergence*, by the movements associated with distance, indispensable to the function of the sensory part; the bonds which unite the sensory part and the motor part being traversed by a particular reflex which it is convenient to call the *retinal reflex of convergence*.

(a) *Sensory Part of the Apparatus of Binocular Vision*.—The sensory part of the apparatus of binocular vision is characterized by three properties:

The faculty of perceiving at the same time the binocular images of an object and of fusing them into a single sensation.

A special method of projection of these images, for their localization in space.

Its relations with convergence.

The faculty of perceiving at the same time binocular im-

pressions of the same object is shown in a very striking manner by *diplopia*, when the images of the same object do not strike upon the determined parts of each retina, called identical or corresponding points.

But this faculty of perceiving at the same time impressions in each eye is not shown alone by diplopia. In binocular fusion each eye preserves an individual action. There is not, following the comparison of Donders, "a neutralization of each image, giving birth to a third which differs in its composition as a chemical composition differs in its elements";* there is a concomitance of the two impressions, as maintained by Helmholtz and Reymond (of Turin). Stereoscopic relief is the consequence and the proof of individuality that the two retinal impressions are preserved in the resulting sensation.

It is true that the stereoscopic fusion has another result than the production of relief: it produces the disfiguration of the figures observed in the stereoscope, or, if you prefer the images, of each eye, by blending them into an image having a new form. By new form I mean not only the relief, but the symmetry, or relative disposition, of the different points of the image. In other terms, two dissymmetrical figures not geometrically superimposable give place to a new figure perfectly symmetrical. The belief that this change of form implies the suppression of certain parts of the images of each eye—a faculty which elsewhere really exists, and which Donders has invoked in support of his opinion—is not true. This change of form results, not from the suppression of certain parts of each image, but the different localization in space of homologous points of each monocular image, and this different localization, from which the relief arises, supposes necessarily, as it seems to us, the union of action of the two retinæ, the concomitance of the two impressions in the resulting sensation.

The images of the same object transmitted to the brain

* Donders, *La vision binoculaire et la perception de la troisième dimension* (*Annales d'Oculistique*, T. LVIII. p., 24).

by each retina may then be fused in a single sensation, or may be perceived separately, giving rise to the production of diplopia.

It is a common observation, that an object fixed with the eyes is only seen singly, if the binocular images of the object strike upon the determined parts of each retina. If, while looking at an object, one of the ocular globes is displaced with the finger, two objects are seen, because, under these conditions, the images do not fall upon the determined parts of each retina. It will be the same if the image upon one retina be displaced by means of a prism. It is this fact which has given rise to the theory of identical or corresponding points advanced by Jean Müller, according to which there would be in the two retinæ parts anatomically bound together by means of the nervous system in such a way that a luminous impression on identical parts is mingled in a single sensation, while the impression on two points not identical gives the sensation of two lights.

The identity of the retinæ, which expresses the mode of fusion of binocular images, constitutes a fundamental property of the sensory apparatus of binocular vision. The principle is indisputable. How does it happen, then, that the theory of identical or corresponding points has been so disputed, so contested? It is because the idea of identity has been twisted by the superadded conceptions.

For Jean Müller the identity of the retinæ has for its result cerebral fusion and nothing more. Moreover, his theory of identical points has been designated by the name of *subjective identity*. In other words, he denies the second property that we shall study—the faculty of projecting outward our retinal impressions. The object of binocular vision, which is the more precise localization of our visual sensations in space, would be lost, and there would be no reason for the existence of the apparatus for binocular vision. For the celebrated physiologist the notion of visual space is purely subjective. We have in us the notion of space, and we refer to it, as to a measure, our perception of

objects. The representation of the depth of the visual field is not a sensation, but an *idea*.

The second conception by which J. Müller has falsified the notion of the identity of the retinae is that of *oroptère*; that is to say, the geometrical figuration in space of points which are seen singly with the two eyes.

If we suppose two lines starting from two identical points of the retinae and passing through the optical center of each eye, these lines will come together in a point in space. A light placed at this point in space will appear single because the binocular images will strike upon points of the retinae considered identical. To each two identical points there corresponds a point in space. The sum of these points in space constitutes what is termed *oroptère*.

The stereoscope is not slow in showing the falsity of this conception, in proving that we have the faculty of fusing retinal images formed upon points not identical. The experiments and criticisms of Wheatstone have been the point of departure of discussions which are really without object. They see a false conception of the identity of the retinae; they do not see the property itself. With the identity of the retinae, such as gives rise to the conception of *oroptère*, binocular vision would be simply impossible, or at least very confused, giving place to the production of double images for the greater portion of the objects contained in the visual field. It is in vain that Helmholtz and Hering have imagined *oroptères* more complicated than that of J. Müller. From the moment that these are geometrical structures—that is to say, something absolute—they can only give a false idea of the function of binocular vision. *Oroptère* may serve to bring out a better understanding, an exposition of facts, but in attributing to it a physiological significance one establishes the principle of irreducible contradictions.

To geometrical or anatomical identity we must oppose *physiological identity*, implying a certain elasticity of the apparatus necessary for its best function. We must not lose sight of the fact that it is essentially a cerebral func-

tion, and in giving a mathematical formula to such a function the truth is perverted under the pretext of pointing it out exactly.

The second property of the sensory apparatus of binocular vision resides, we have said, in *a special mode of exterioration or of projection of visual images for their localization in space.*

The principle of projection, of transportation outward of our visual sensations, which has been the point of departure of the theory of projections, is not less certain than that of the identity of the retinae. This will become evident, I hope, by the developments which will follow, especially by the study of stereoscopic vision. But for the theory of projections, as for that of identity, the principle, the physiological fact, has been falsified by superadded conceptions. Thus it is that the two theories have been opposed, the one to the other, while the physiological facts that have been the point of departure are two different aspects of the same function, and instead of being contradictory, they are complementary, and are inseparable the one from the other.

All sensation has its seat in the brain, but the sense which has for its object the placing us in relation with the outside world would not have its object fulfilled if the sensation were localized where it really existed; whence the faculty of exterioration common to all the senses. But while this faculty of exterioration does not pass beyond the skin or the mucous membrane in certain senses,—in the sense of hearing, and especially in sight,—it is a remarkable fact that it extends beyond the body, beyond the point where the peripheral excitation has taken place.

The visual act carries with it, then, a double process, the one centripetal, the other centrifugal, the process of impression and the process of exterioration. The existence in the sensory apparatus of vision of two sets of fibers, the one centripetal, the other centrifugal, is truly an agreement with this double process. If it is permitted to admit that the centrifugal fibers discovered by Monakow in the corona

radiata of Reil going from the cortical visual center to the intracerebral nucleus, serve for reflex acts, the same rôle might be attributed to the centrifugal fibers discovered in the optic nerve by Ramon y Cajal and Van Gehuchten.

In the centrifugal and centripetal course it is necessary to distinguish an ocular path and a cerebral path. In the ocular path everything goes according to the laws of refraction. If the double phenomena have their seat in only one eye, as seems to be admitted, there would be no way of distinguishing the line of impression from the line of projection; they would be confused. But in the central path it is not so. The brain can dissociate the two processes, and separate the two lines, in such a way that the line of projection does not return to the object from which it came. It is so, not only in certain cases of abnormal projection in strabismus, but also in diplopia produced by a vicious position of the globes, as in stereoscopic vision, that is obtained, as we have seen, with a false projection. In cases of this kind the line of projection, at the moment that it strikes the retina and commences its ocular course, has no longer the same direction as the line of impression, since it does not return to the object and gives rise to a false projection. There is, then, an opportunity to distinguish, in the ocular path, the *axis of impression* and the *axis of projection*. The axis of impression is the line that passes from the luminous point through the optical center. The axis of projection is the line which, from the retinal point, by which the exterioration of the luminous point is produced, passes through the optical center.*

Let us take note now that, relatively to the position of the ocular globes, there are two different methods of

*Volkmann has distinguished (Helmholtz says replaced) the lines drawn through the retinal image and the posterior nodal point of the eye from the normal lines to the retina, and calls them lines of direction. But Helmholtz and all authors call the line of direction the line drawn from the luminous point to the nodal point. Hering also remarks that the "*direction lumineuse*," and "*direction visuelle*" have different meanings. "But," adds Donders, who quotes him, "this ambiguity need cause no inconvenience, since the two directions coincide."—*Annales d'Oculistique*, T. LVIII. p. 33.

exterioration or projection. When we look at an object with one eye alone the projection is good, that is to say, we localize the object where it really is, whatever may be the position of the globe (either the eye fixes the object or looks elsewhere). There are exceptions only in certain cases of paralysis of the ocular muscles where the muscular sense intervenes. We see that this method of projection exists also in the vision with both eyes, that I have called simultaneous vision; in concomitant strabismus, for example, where simultaneous vision replaces binocular vision. When the binocular visual apparatus is in play the condition is no longer the same. The direction in which exterioration is produced is determined by the relative position of the two eyes. The two eyes are then functionally associated, and the least derangement in the association of their movements produces a false projection for one eye and sometimes for both.

Binocular vision, then, implies *a special method of exterioration or projection*. Moreover, this would be necessary in order to insure the bringing together and fusion of the binocular images in the same point in space. Having given this mode of projection, let us see how it insures the bringing together and fusion in space of the images of each eye. This fusion is the consequence of a fundamental property of the visual apparatus which may be expressed as follows:

We localize our binocular retinal impressions at the point of meeting of the primary and secondary axes of projection.

The fact may be considered as evident for the point directly fixed where the lines of vision converge. The application of this law is not more difficult, even for the points of a plane image whose different points are near enough to the point of fixation that we may neglect the curve of the retina. In fact, the secondary axes which these points of the object follow, as they go to join their focus in the eye, fall upon identical points on the retina, and, inversely, the exteriorated retina images follow the same direction and meet at the junction of these axes. It is the same for points further removed from the point of fixation,

provided that they be contained in a certain surface corresponding to that of *l'oroptère*.

The difficulty arises when the points are situated in front of or behind the point directly fixed, in front of or behind the surface of *l'oroptère*. Geometry demonstrates that the axes, starting from these points and passing through the optical center of each eye, do not fall upon identical points of the retina, and the theory of identical points shows that these points will be seen double. In fact, experience demonstrates that, *in certain conditions*, this is so.

If we place three pins along a ruler at a sufficient distance apart, and hold the ruler horizontally with one extremity resting on the bridge of the nose, it will be found that when both eyes are fixed upon the middle pin the other two will be seen double. The two images of the pin in front of the one fixed are crossed, the images of the pin behind are homonymous. This diplopia, called physiological, which is produced in conformity to the theory of identical points, seems to be contradictory to the law that we have just stated. In this experiment the localization is not made at the intersection of the axes of the two pins that are seen double: it is therefore false for each image, neither of which corresponds to the real position of the object. The contradiction is only apparent.

Let us take note first that in ordinary vision these things do not happen, unless we fix a tree in a landscape, in which case the trees nearer or further away will be seen double. In reality, behind this apparent contradiction is hidden an ingenious artifice of nature by means of which *we localize binocular impressions in space differently, according as they result from the fusion of retinal images identical or non-identical*, and we see that this different localization is a consequence of the general law in virtue of which we localize at the point of intersection of the axes of projection. The stereoscope furnishes us with the demonstration, but for that purpose it is necessary to define precisely the *physiological mechanism* of stereoscopic vision, which we have thus far omitted to do.

The characteristic of stereoscopic vision is the fusing of different perspective images of the same object, that is to say, images that are not geometrically alike. If on a length of string or long stick held horizontally, one extremity corresponding to the middle of the distance between the two eyes, we place marks representing different distances of observation, then when the eyes are fixed binocularly on the farthest point and the eyes are closed alternately, it will be found that the nearest points are displaced to the left for the right eye, and to the right for the left eye. If, on the other hand, we take two photographs of a landscape so that in each photograph the apparatus be at a distance apart equal to the distance between the two eyes, these two different perspective images of the landscape realize the geometrical conditions of vision with the two eyes, that is to say, by referring to the furthest plane of the landscape, the nearer objects are found to be displaced to the left for the right eye and to the right for the left eye. In other terms, the two photographs being juxtaposed in the stereoscope, the homologous parts, that is, those parts which represent the same point of the landscape, are nearer to the median line, as, in reality, they are nearer to the observer. It is on account of this peculiarity, because they realize the conditions of what Helmholtz has called the stereoscopic parallax, that these photographs, or designs traced according to the same principle, give in so perfect a manner the appearance of relief.

These photographs or designs of the same object are not then geometrically alike, are not superimposable. The homologous points of these figures do not strike on the identical points of the retina, with the exception of those in the most distant plane of the object figured, where we suppose that the principal axes cross. They fuse, nevertheless; whence the certain consequence, already put in evidence by Wheatstone, that *the visual apparatus has the property of fusing retinal images that do not strike upon identical points*, that is, the property of neutralizing the physiological diplopia of which we are about to speak.

Wheatstone's experiments demonstrate another fact, to which sufficient importance has not been given: *The fusion of images which do not strike upon identical retinal points modifies the localization of the resultant image in space*, that is to say, this localization is different from that which results from the fusion of identical retinal images.

Finally the stereoscope demonstrates a third fact: *The different localization in space of binocular images, according as they result in the fusion of retinal images identical or non-identical, is a consequence of the general property in virtue of which we localize our binocular impressions at the intersection of the principal or secondary axes of projection.*

If we can demonstrate this third fact all the contradictions disappear.

It is here necessary to describe precisely the physiological mechanism of stereoscopic vision. It is because we have not studied this before, because we have considered stereoscopic vision from a purely geometrical point of view, that we have twisted the question and, in consequence, introduced into the study of binocular vision a large element of confusion.

The theory of the stereoscope as explained in works on physiology and physics is not exactly correct.

Stereoscopic vision is essentially produced by the fusion of the two images of a single object, but what is the physiological mechanism of this fusion? It is admitted to be the result of the superposition of two figures of an object producing upon the retina the same effect as if they were impressions by a single object fixed by the two eyes. This result is obtained in Wheatstone's stereoscope by the reflection of mirrors; in Brewster's by the deviating action of prismatic lenses; finally, in the stereoscope with simple lenses the eyes are placed parallel and the figures having the same amount of separation as the eyes would give two images in the central region of each retina, as if the object situated at infinity were fixed with the two eyes.

A fundamental fact is forgotten which, in itself alone, shows the error of these three interpretations. This fact is

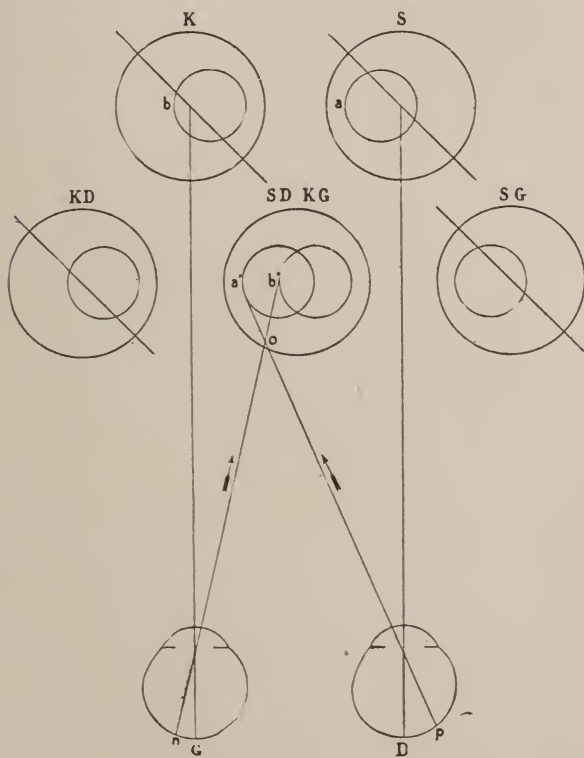
that, in order to obtain a stereoscopic relief, it is a preliminary condition that four images be produced, that is, that *each figure be seen double*. Of these four images, two are forced to produce the relief, the other two are useless, and it is the object of the partition of the stereoscope to suppress them. If we wish to study the mechanism of stereoscopic vision we must experiment without the partition.

Stereoscopic vision is obtained not by the superposition of two pictures of the same object, but *by the aid of subjective images of these pictures, exteriorated with a false projection*, that is, projected in a direction that does not correspond to the real position of the figures. In order to understand the mechanism we must consider, *not the process of impression, but the process of projection*.

When we look through a stereoscope we notice at once the sensation of a certain amount of effort, of a certain adaptation of the visual apparatus to obtain the relief. Of what does this adaptation consist? It consists in adapting the visual apparatus for distant vision, although the figures are more or less near, that is to say, in relaxing the convergence and accommodation, in looking at the figures without fixing them. The prisms with the base toward the temple, or the convex glasses, have for their object the facilitating of this adaptation. It is not by their physical action that they produce stereoscopic vision, as is proved by the fact that with a certain amount of practice stereoscopic vision may be obtained without an instrument. The relaxation of convergence has the effect of bringing back the axes to parallelism, that is, the placing of the eyes in a state of relative divergence as compared to the position of the figures; it is for this reason that each figure is seen double, in crossed diplopia, as if one were looking obliquely outward. The two figures are projected to the left by the right eye and to the right by the left eye. The appearance of relief arises from the fusion of these subjective images exteriorated with false projection. This primary fact established, all is explained naturally, and we see that the

sensation or appearance of relief arises by virtue of the general law of the localization of binocular images at the intersection of the axes of projection.

The subjoined figure gives the schematic representation of stereoscopic vision. *D* is the right eye; *G*, the left eye. *K* and *S* are two figures of which stereoscopic vision gives the sensation of a solid cone, the truncated apex of which is prominently in advance.



SCHEME OF STEREOSCOPIC VISION.—*D*, right eye. *G*, left eye. *S* and *K*, stereoscopic figures giving by their fusion the sensation of a truncated cone. *KD*, *SD*, images of these two figures projected by the right eye. *KG*, *SG*, images of these two figures projected by the left eye. *p a'*, axis of projection of the point *a*; *n b'*, axis of projection of the point *b*.

The oblique lines indicate that it is necessary to make an abstraction of the figures *K* and *S*, also of their images *KD*, *SG* (suppressed by the partition of the stereoscope), in order to consider only *SD* and *KG*, which, by their fusion in space, produce stereoscopic vision.

The median partition of the stereoscope being suppressed, these two figures will be seen by each eye, and as the two eyes, in order to obtain stereoscopic vision, are placed in a state of relative divergence, they will be seen double in crossed diplopia; that is, the exteriorated images, of these figures will be projected to the left by the right eye and to the right by the left eye. These four images KD , SD and KG , SG , are falsely projected, that is to say, in a direction which is not that of the figures which have produced them. KD and SG are not utilized for stereoscopic vision; the median partition of the stereoscope is for the purpose of suppressing them. It is necessary, then, to make an abstraction both of the two figures K and S and of the two useless images KD , SG , whose suppression is indicated in the figures by a stroke across them, and to consider only the two images SD and KG . SD is the image of the figure S exteriorated by the right eye; KG the image of the figure K exteriorated by the left eye.

If we suppose the great circles exteriorated by identical retinal points, they will be fused in space in virtue of the properties of identical points and will be localized in a plane whose distance will be determined by the intersection of the principal axes.

It will be the same with the small circles. Not having the same center as the large circles, they will be necessarily exteriorated by retinal points non-identical, and will be seen in crossed diplopia with the figures considered.

In fact, this is what takes place if the appearance of relief is not produced. But the property of stereoscopic vision is, as we have said, the accomplishment of the fusion of non-identical retinal images, a fusion which is inevitably accompanied by the sensation of relief.

To understand where the image resulting from the fusion of the small circles will be localized, let us consider the two homologous points a b of these small circles. We know that these points are exteriorated by non-identical retinal points and that they ought to be seen double if stereoscopic fusion does not intervene. In fact, the images of these

points are exteriorated according to the axes of projection $p a'$ and $n b'$, starting from the retinal points and passing through the optical center of each eye. In the plane of the large circle they are seen double, in crossed diplopia, as indicated in the figure. When the fusion of the two images a' and b' takes place, where will the resultant image be localized in space? According to the law of localization at the intersection of axes, it ought to be localized at o , that is in a plane nearer than that of the large circle. This is what really takes place, and it is this which causes the idea of relief.

It is seen, then, that the different localization of binocular images in space so that they result in the fusion of retinal images formed upon identical or non-identical points, is a result of the general law by virtue of which *we localize our binocular retinal impressions at the point of intersection of the principal and secondary axes of projection*. Which was to be proved.

To verify the accuracy of this law, let us suppose the case where the two stereoscopic figures have been designed to give the sensation of a hollow cone. The two small circles will then be exteriorated in homonymous diplopia before the fusion, that is to say, the axes of projection of the points $a b$ will no longer cross in front of the plane of the large circles, as in the preceding case, but behind it. The image resulting from the fusion of small circles corresponding to the truncated summit of the cone will be localized behind the base and will give the sensation of a hollow cone.

Let us suppose a third case where, with the ordinary stereoscopic figures, there is produced, by an effort of convergence, a pseudoscopic effect, that is, a reversal of the hollows and projections. The eyes, instead of being in a state of relative divergence, are in a state of convergence exaggerated by the position of the figure; then the points $a b$, instead of being exteriorated in crossed diplopia, will be in homonymous diplopia and, consequently, will be localized behind the base of the cone.

In whatever way these conditions may be realized, the

law of localization at the intersection of the axes of projection is respected.

The production of stereoscopic relief is one consequence of this law. It is on account of this law that identical and non-identical retinal images are localized differently in space. Non-identical images are localized in front of the plane or surface of localization of the identical images, when before fusion they produce a crossed diplopia in this plane; or behind, when before fusion they give an homonymous diplopia.

The law of localization of binocular images at the intersection of the principal and secondary axes has been formulated by Giraud-Teulon. This fact is admitted without contest in so far as concerns the principal axes corresponding to the central fixation, but the localization at the intersection of the secondary axes is strongly contested and formally desired by Nagel and Donders. I am the happier to confirm my regretted master in this question in that I have had to oppose other ideas of his.

Giraud-Teulon has, like ourselves, demanded the demonstration of the law of the stereoscope. But this demonstration, "somewhat labored," as he himself recognized it, was not conclusive, because the theory of stereoscopic vision upon which he based it, which is the same as that of the most of the world, is false. He reasoned upon the geometrical construction of stereoscopic figures and upon the process of impression, or, at least, as if the line of impression and the line of projection were confused, while they are essentially different, stereoscopic vision implying, as a primary condition, a false projection of images, as we have already seen.

We should now understand the mechanism of normal binocular vision. Stereoscopic vision is, in fact, an abnormal binocular vision, as we have been enabled to show by the analysis that we have made. It is none the less useful in the study of the properties of the sensory apparatus of binocular vision, and it is on account of the ideas that they have furnished us that we can understand the connection of the facts in normal binocular vision.

Let us imagine a triangular prism, placed vertically, one of its angles turned toward the observer and corresponding to the median line. The observer fixes a point of this edge upon which, consequently, the lines of vision converge. The binocular images of this point fall upon the two central depressions, identical points *par excellence*. By reason of the property of identical points, the brain receives and exteriorates only a single image. This image will be localized at the intersection of the principal axes of projection, and will return to the point from which the impression was sent out.

Let us see now what takes place at the lateral angles situated in a more remote plane than the median angle, upon which the lines of vision are constantly converged. Geometry demonstrates to us that any point of these angles will produce a binocular image upon non-identical retinal points. According to the properties of these points, the brain ought to receive and exteriorate two distinct images of the same point. This is, in fact, what takes place in certain conditions and is what would take place always if everything were kept within the limits of the process of impression, if, as J. Müller thought, the brain was limited to the reception and registration of retinal impressions. But the act of vision includes a second operation, which is that of a projection especially characteristic of binocular vision. In this second operation, the double images, projected by non-identical retinal points, will be fused, but with a different localization from that of the points of the median angle directly fixed, a localization which will be, according to what we have established, behind this angle, and will correspond precisely to the position in space of the lateral angles and of the point observed.

Taken altogether, it is seen that in the case of non-identical retinal images, the object of so much discussion, the brain corrects, by the process of projection, the sensory error that would result from the process of impression alone. It is seen then that if either process is considered

independently of the other it will be impossible to understand it. This is more or less what makes partisans of the theory of identity and partisans of the theory of projection, and is the principal cause of the great confusion that reigns concerning this subject. It explains how it has been possible to oppose these two theories the one to the other, and to create between the facts an antagonism so decided that there have been given to them absolute forms, such as *l'oroptère* or Nagel's spheres of projection. But this antagonism is artificial; the contradictions are in the theories and not in the facts. The physiological fact of the identity of the retinæ, and the physiological fact of projection, in spite of being opposed, are two different aspects of the same function, two properties of the same sensory apparatus of binocular vision.

One last difficulty remains to be solved. Why are these retinal images exteriorated by non-identical points sometimes projected separately, giving rise to a physiological diplopia, and sometimes fused in a single image? The explanation is this:

In the doctrine of evolution, it is the external excitations that have developed the visual apparatus in the same way as the apparatus of the other senses. The reactions which characterize our sensory apparatuses are in such intimate relations with the impressions or physical excitations which determine them, that they have been developed by them, through long and continued action in a series of beings. When an apparatus is the result of a complex differentiation, as is the visual apparatus, it reacts differently to different excitations. It is a principle which seems to me indisputable and one which we shall have to invoke in another part of this work. It is in this way that we can explain the fusion, or the failure of fusion, of retinal images exteriorated by non-identical retinal points.

The fusion of these images is essentially joined to the sensation of relief, as we have seen. In order that it be produced, it is necessary that the retinal excitation solicit this sensation, that is to say, determine the cerebral reac-

tion that produces this sensation. This is what takes place in the natural vision of a solid object or a landscape representing different planes, but it is especially in the artificial production of stereoscopic relief that we have the demonstration of a particular cerebral reaction provoked by excitations which solicit the sensation of corporeal relief. This reaction is essentially proper to the sensory apparatus of binocular vision.

Thus it is explained how retinal excitations similar in appearance produce different cerebral reactions. Let us place three pins in the form of a triangle, reproducing the three angles of the triangular prism of which we have already spoken. If we fix the nearest pin, the other two, supposing them to be at a proper distance, will be seen double, because, under these conditions, the brain does not receive the excitation of corporeal relief. That is why the cerebral reaction is different, although the pins have the same geometrical arrangement that the angles of the prism had, and form their images upon the same points of the retina.

The connections of the retina with the visual centers which characterize the sensory part of the apparatus of binocular vision, and are summed up in the property of identical points of the retina and in a special mode of projection of the visual images, are not equally distributed throughout the whole of the retina.

The two foveæ, which serve in each as the points of central vision, upon which strike the binocular images of the objects fixed, constitute, as we have said before, the identical points *par excellence*. It is probable that for the foveæ the identity is absolute, that is to say, an object is seen single only if the two images impress rigorously the identical points of this region, while we know that in neighboring parts the identity offers a certain elasticity, and two images often become fused although they are not formed upon identical geometrical points. The absolute identity of the foveæ is probable, because the elasticity which is indispensable in assuring the single vision of cer-

tain points of an object which form their retinal image along the secondary axes is not necessary for the points directly fixed, corresponding to the principal axes, since we possess the faculty of converging the principal axes exactly upon the point fixed.

It is then likely that the identity of the retinae does not present the same characteristics in the fovea serving for central fixation and in the neighboring part. In the second place, the connections that give rise to the production of identical points do not exist throughout the retina, and grow more feeble as we move away from the fovea. I refer this question to the works of Volkmann, Mandelstamm, and Schoeler. The last, in a work done under the direction of Helmholtz, finds that the identity of the retina may be spoken of only within the following limits, beginning from the fovea, at least in his own eyes :

Above 6 millim., 20 of retinal capacity ; below 3 millim., 10 of retinal capacity ; outward and inward 2 millim., 85 of retinal capacity.

These results were obtained by the stereoscopic fusion of very simple images, by instantaneous lighting.

The nervous connections which serve as an anatomical basis for the identity of the retinae diminish from the fovea to the periphery and are not equally developed in all directions. The fibers which lead to the fovea may be represented as forming an axis about which are developed those connections that, upon the retina, are distributed more or less according to the meridians, and without doubt vary in different individuals according as their binocular visual apparatus is more or less developed.

b. Convergence, the Motor Part of the Apparatus of Binocular Vision.—The function of binocular vision, as we have defined it,—that is, founded on the identity of the retina,—would be impossible without convergence. Let us consider only the foveæ which, in each retina, as we have already said, constitute the identical points *par excellence*. When we look at infinity, the optical axes of the two eyes, starting from the fovea and passing through the optical

center, are parallel. Under these conditions, the binocular images of an object situated at infinity fall upon the two foveæ and are fused without the intervention of convergence. But according as the object is brought nearer, if the eyes remain in the same position, the images are formed outside the fovea upon non-identical points and the object is seen double. Convergence, in directing the axes upon the object fixed, according to its nearness, insures the formation of the images upon the fovea, whatever the distance may be, as far as the *punctum proximum* of convergence. What is true of the formation of images along the principal axes is equally true for those formed along the secondary axes with the exceptions that we have noted.

Convergence, then, is that property of the visual apparatus by which the ocular axes are made to converge upon the object fixed, whatever its distance may be.

These conditions demonstrate the relation which unites convergence to the function of binocular vision and foretells the existence of connections uniting the sensory part of the apparatus to convergence, which represents the motor part.

Movements associated with convergence or with distance constitute a separate function. These movements are executed by influences distinct from those which preside over movements associated with direction. Let us see what these influences are and what are the factors of convergence.

The movements of the organism have two origins, voluntary impulses and reflex impulses. We will have to establish subdivisions for the voluntary as well as for the reflex movements. I would limit myself to distinguish, in these reflex movements, direct reflex action and indirect reflex action; I understand by indirect reflex action the movement which results from a muscular association supposing the existence of no direct reflex arc, but a connection between the center of movement spoken of and another center that receives reflex impulses directly. It is thus, for example, that contraction of the pupil is pro-

duced in near fixation; it is, in my opinion, the result of an indirect action of the reflex of convergence or of that of accommodation, as I have shown in the anatomical conditions.

We are able to converge by a voluntary effort, to squint voluntarily, but as voluntary convergence does not occur in the regular exercise of the function, we may neglect it. We need only call upon the influence of volition for a condition of the exercise of convergence that we shall study further on.

Convergence is essentially executed under the action of a particular reflex that I have called the *retinal reflex of convergence*. The existence of this reflex is easy to demonstrate, by a simple experiment that everyone practices daily, but the significance of which has been falsified by the psychological conception of vision.

Fix with both eyes a black point upon a sheet of white paper; you see it single. Place before one eye a prism of 8° to 10° , the angle vertical—that is, so that the deviation is horizontal; the black point is immediately seen double; after a few minutes it is seen single again.

The fact is explained in psychological language by the need of single vision, by the instinctive tendency to binocular vision, by the attraction of images, etc. Physiologically it is explained thus: by its deviating action the prism displaces the image of the black point upon the retina in such a way that the images no longer fall upon the foveæ, and do not make an impression on identical points, hence the diplopia. But this excitation of two non-identical points by the two images of the same object determines, by reflex action, a movement of convergence or divergence, which brings back the images upon identical points and allows the object to be seen single again.

It is, furthermore, easy to demonstrate that it is only convergence that is brought into action in this way. If, instead of giving the angle of the prism a vertical position, we place it horizontally, we will be unable to neutralize the diplopia, or in only a very slight degree. It is not that

I identify convergence absolutely with the faculty of modifying the axis on the plane which corresponds to the action of the internal and external recti muscles; but, in fact, these things are so because of the concurrence of the movements associated with direction, which are determined, as we have seen, by a particular reflex; convergence is not exercised, except to a very limited extent, in the vertical direction, to induce the meeting of the axes upon the object fixed.

In order to produce the retinal reflex of convergence two conditions are necessary. It is necessary that the excitation be carried to both retinae, contrary to other ocular reflexes which are produced in both eyes by the excitation of a single retina. It is necessary, in the second place, that the sensory apparatus of binocular vision be intact, and be in a state to react, for we see that the excitation of the two retinae is powerless to determine the reflex when the sensory apparatus of binocular vision is altered.

Thus the association of convergence with the apparatus of binocular vision is established.

The retinal reflex of convergence constitutes the essential factor in convergence, but it is not the only one.

When we look at an object approaching nearer and nearer two muscular acts intervene to produce distinct vision: accommodation, whose object is to obtain upon the retina a clear image of the object fixed—that is, to make each eye see distinctly—and convergence, whose object is to make the two eyes see single.

The relation that unites convergence to accommodation has long been known in ophthalmology; it is such that, in normal conditions, we can neither accommodate without converging, nor converge without accommodating. The effort of accommodation determines an effort of convergence, even when we look with only one eye.

Accommodation, then, constitutes a new factor in convergence. It is less essential, from a physiological point of view, than the retinal reflex of convergence; it acts, moreover, by an entirely different mechanism. The relation

that unites convergence with accommodation is the result of a muscular association. Like all muscular associations, it presents a certain elasticity, and is susceptible of modification to adapt itself to the requirements of the function. In fact, this relation is incessantly modified to allow of binocular vision in presbyopia, hypermetropia, and myopia, which imply the intervention of convergence and accommodation in different proportions.

The retinal reflex of convergence and accommodation constitute the principal factors of convergence, but convergence may still be exercised by other influences.

Let us suppress the influence of accommodation by atropine, or by sufficiently strong convex glasses, and look at an object with an opaque screen or a ground glass between the object and one eye. If the individual has normal vision, the eye excluded by the screen is, nevertheless, directed toward the object fixed. In other terms, both eyes converge upon the object fixed in spite of the absence of accommodation and in spite of the absence of the retinal reflex of convergence, which implies the excitation of both retinae by the image of the object fixed.

To explain this fact, a third factor of convergence is admitted, which Hansen Grut calls "the sense of distance," and Alf. von Graefe "the sense of convergence." If we were to analyze what takes place in this experiment, we must note that the movement of convergence supposes a primary center of association of muscles, determining, when it is in action, the contraction of all the muscles that participate in this movement. It is a purely automatic association that is present for all associated movements. If with one eye covered we look with the other at an object situated at a certain distance, the covered eye invariably executes the same movements as the uncovered eye. It would not occur to anyone to invoke a sense of direction to explain the motion of the covered eye. We may, then, admit that convergence is executed automatically when this inferior center of association receives an impulse. The question is to know how this excitation of the center of

association is produced, when its two ordinary excitants, the retinal reflex of convergence and accommodation, are absent. This excitation is the result of a slightly complex mental process, in which the volition and the appreciation of distance intervene. It may be explained by the following experiment, cited by Helmholtz: If, both eyes being closed, we fix mentally an object which we previously know to be at a certain distance, and then quickly open the eyes, it is nearly always seen single, showing that both eyes, although closed, converge upon the object, or, at least, very close to it.

We may then represent the mechanism of convergence as follows:

There exists, as in all muscular movements, an inferior center that presides over the automatic association of the muscles which participate in convergence, in which may be admitted two secondary centers or, at least, two functional modalities, for convergence and divergence.

This center may be made to act:

1. Through retinal excitations of the binocular visual apparatus, by a direct reflex—the *retinal reflex of convergence*.

2. By *accommodation*, and by an indirect reflex action, by means of which the connections that unite the motor centers of convergence and accommodation, in virtue of which the reflex of accommodation acts upon both centers, the same as the reflex of convergence acts also upon both centers.

3. By a complex process, in which the appreciation of distance and the volition intervene; a process that, for lack of a better term, we may call *conscious convergence*.

4. By an impulse purely voluntary, without functional object.

These physiological distinctions are confirmed by pathology. The diseases of innervation limited to the movement of convergence, in the form of paralysis or contraction, establish the functional and anatomical independence of this function. In 1882 I described these diseases under

the title "Paralysis of the Associated Movements of the Eyes" (*Archives de Neurologie*), and I believe they are to-day accepted by the whole world.

But the pathological facts permit us to push further the analysis of the function of convergence, by showing us examples of isolated or simultaneous alteration of these different factors.

Concomitant strabismus offers us the first category of facts. I believe that it is established that this affection, in which only a disproportion of the length of the muscles can be seen, is, in reality, wholly a vice of the development of the binocular visual apparatus. The immediate cause of the deviation resides in a trouble of the motor part of this apparatus, in a trouble of innervation of convergence. The so-varied causes of strabismus modify the convergence through these two principal factors, the retinal reflex of convergence and the accommodation. Although so instructive, I cannot speak here of the pathogenesis of strabismus; I refer to my publications on this subject. I limit myself to the consideration of two facts among the many known.

Donders, in the study of the convergent strabismus of hypermetropes, admits that the perturbing influence of the accommodation is antagonized by "the instinctive tendency to binocular vision." This instinctive tendency to binocular vision is nothing else than the retinal reflex of convergence. It is this second regulator of convergence that prevents all hypermetropes from squinting, as would be the theory of Donders. In order that the exaggerated accommodative effort of hypermetropes should produce strabismus, it is necessary that it should be seconded by other causes, and those other causes are those which alter the retinal reflex of convergence.

Divergent strabismus, in the beginning, offers us a contrary example, that is, a change in the retinal reflex of convergence antagonized by the accommodative effort. In most subjects the deviation is produced only in unfixed vision or fixation at distance, because in these conditions,

accommodation being relaxed, the retinal reflex alone governs the position of the axes. The deviation would disappear, on the contrary, when the gaze is fixed upon an object, because the influence of accommodation comes into play.

Still more characteristic facts are furnished by certain neuropathic states which oculists have noted for a long time and erroneously referred to an insufficiency of the muscles. They are really troubles of innervation of the convergence, and it is the different modalities of these troubles that are instructive.

To discover the difficulty of convergence in the cases most commonly observed, it is necessary either to cover each eye alternately, or, better, as recommended by Von Graefe, to place upon one eye a prism with a vertical refraction. In this way a diplopia is produced, and, by the crossed or homonymous arrangement of the images, the trouble with the convergence can be explained; the convergence being most often modified in the sense of insufficiency for near fixation, but sometimes also in the sense of excess of convergence, for fixation at a distance. The most typical cases are those where there is established at the same time an insufficiency of convergence for near objects and an excess of convergence for distance, accompanied by a modification of accommodation of the same nature and in the same sense, that is, an insufficient accommodation for near objects and an excess for distance, producing a spasmodic myopia.

These facts furnish us with an example of *concomitant alteration of convergence and its accommodative factor*. But a remarkable thing about patients attacked with this functional trouble, which renders the use of the eyes very painful and sometimes impossible, is that they do not suffer from diplopia, or experience it in a mild way only. The absence of spontaneous diplopia shows that convergence continues to be actuated by the retinal reflex of convergence; fusion is accomplished, although badly, in spite of the muscular trouble. To discover the trouble

with the convergence it is necessary to place upon one eye a prism with vertical refraction, which, rendering binocular vision impossible, suppresses the influence of the retinal reflex.

In another category of facts, which represent a more advanced degree of the same affection, the retinal reflex is altered at the same time as is the accommodation. The same characteristics are encountered as before, with this difference, that the diplopia is produced spontaneously, as in ordinary paralysis, simply by the application of a colored glass upon the eyes. In certain cases a curious peculiarity is observed, which attests the complete abolition of the cerebral faculty of fusion. The convergence is found unmobilized, in a state of contraction more or less pronounced, making the axes cross at a distance of two meters, for instance. This side of that distance the diplopia is crossed, on the other side it is homonymous. Or, in spite of the slight dispersion of the images and some precautions that may be taken, it is impossible to bring about their fusion at the intersection of the axes. By a quick transition the crossed diplopia becomes homonymous or *vice versa*.

These new facts offer us an example of the *concomitant alteration of convergence, and of its two factors, accommodation and retinal reflex*.

The pathological facts allow us to push still further the analysis of the function of convergence. The typical cases of contraction of convergence with concomitant alteration of retinal reflex and accommodation present two varieties. If convergence is induced by following the finger as it progressively approaches the subject, it will be remarked that in certain subjects the movement of convergence is *nil*, or executed very imperfectly, as would be expected. In other subjects, on the contrary, the movement is executed forcibly, although the functional convergence is *nil*, with absolute incapacity for work.

The paradoxical character of these facts disappears if we recall that, in the normal state, convergence is executed

through other influences than its habitual factors, retinal reflex and accommodation. We know that convergence may be produced by a voluntary effort; we can converge upon an object with the eyes closed, representing the distance mentally. It is true, in fact, that the subject who does not converge when asked to fix his gaze upon the finger of the observer, converges when he fixes his gaze upon his own finger and brings it progressively nearer. Since we admit that, in this process, the appreciation of distance is the previous operation which determines a voluntary effort of convergence, it is probable that the subject utilizes his muscular sense to make known to himself the distance of his own finger.

Thus the analysis of the normal function of convergence, and that of the pathological facts, lead to the same conclusions.

One of these conclusions that interests us especially is that convergence is intimately connected with the function of the sensory apparatus of binocular vision, that the principal factor of convergence resides in the retinal reflex of convergence. *Convergence forms an integral part of the apparatus of binocular vision, of which it represents the motor portion.*

The apparatus of binocular vision, as we have said, has for its object the more precise localization in space of the visual sensation. With this localization is connected the idea of the third dimension, the idea of depth, and that of distance.

We have already seen, by the analysis of stereoscopic visions, that the sensory apparatus possesses in itself an element of appreciation of the third dimension, by the different localization in space of binocular visual images, according as they strike on identical or non-identical retinal points. But the principal rôle in the appreciation of the distance of objects is referred to convergence.

Let us recognize at once that if binocular vision constitutes a more precise means of appreciating visual distance, it is not the only one. With one eye we judge the

distance and relief of bodies with sufficient exactness. In monocular vision we have as an element of appreciation: for the distance, the muscular sense of accommodation, the different sizes of retinal images according to the distance, for persons or objects whose size is known to us: for the relief of bodies we have the effects of shade, and the rapid movements of the eye resting upon different points of the object, constituting a sort of ocular touch.

But the appreciation of distance and relief is attained in perfection only by binocular vision.

To make more clear the rôle of binocular vision in the appreciation of distance let us look through a tube of a uniform width at two threads stretched at different distances from the eye. If the difference in distance is not too great for the accommodation to be able to inform us, it is impossible to say surely which is the nearest and which is the furthest when we look with one eye, while with binocular vision this becomes very easy. To note the effect upon relief, look at the hollow matrix of a medal; with both eyes you immediately recognize that the figure is in the hollow. If you close one eye you hesitate and see it sometimes in relief; on opening the eyes all hesitation disappears.

In binocular vision, as in monocular vision, the appreciation of relief does not result altogether from the same mechanism.

The two eyes having a certain amount of separation, when we fix upon an object binocularly, the principal axes of the eyes form an angle which is greater as the object fixed is nearer. We have seen that the exact object of movements of convergence is the modification of this angle according to distance, and we have therefore proposed that they be called associated movements of distance. We have, then, in convergence, the muscular function actuated by a special retinal reflex, an element of appreciation of distance, furnished by the *muscular sense*. The principal rôle of convergence has long been admitted without contest, therefore we need not discuss it.

It was believed at first that it was only by convergence and the muscular sense that the eyes could give us a knowledge of the third dimension, but in 1842 Dove affirmed that stereoscopic vision was obtained by the instantaneous light of an electric spark, that is, under conditions when there was not time for the muscular apparatus to come in action, which would exclude the rôle of convergence. This fact advanced by Dove was contested, among others by Recklinghausen and Donders, who continued to hold that there was no binocular appreciation of the third dimension without movement. But the opponents of Dove have ended by making the *amende honorable*. Since the experiment of Dove, now admitted implicitly, we have learned to know that we are able to appreciate the third dimension and the relief of bodies without the intervention of any movement, by means of the different localization in space of the binocular visual images, according to whether they strike upon identical or non-identical retinal points, a function which pertains only to the sensory apparatus.

We can also explain the contrary assertions concerning the appreciation of stereoscopic relief by instantaneous light, if we recall that stereoscopic vision necessitates a certain adaptation of the visual apparatus, which, like convergence, would not be instantaneous. This explains why the sensation of relief is not generally produced at the first discharge, but after a series of discharges (Recklinghausen, Donders), at least unless certain precautions are taken which effect the previous determination of this adaptation.

We see that convergence and the sensory apparatus have a distinct rôle and a different mechanism in the appreciation of the third dimension. It may be said that convergence informs us particularly about the distance of bodies, and the sensory apparatus about the relief of bodies. As to the mutual concurrence attributed to these two special functions, that is explained naturally, for they are functions of two parts of the same apparatus of binocular vision, as we have demonstrated.

THE INFERIOR TURBINATED BODY.

BY A. WORRALL PALMER, M. D., NEW YORK.

ALTHOUGH this is a small body, still it is beginning to be considered quite important to the normal working of the physical economy.

By the following study of its formation and few other facts I hope to demonstrate its necessity—even more than the immediately surrounding tissues—to the normal and healthful respiration. Therefore deduce the lesson of conservative surgery upon this body; that is, if tissue of the nares need be removed—which is very frequently the case—sacrifice this body as little as possible, instead of doing as was taught the writer when taking his special course: not to molest the harder tissues of the nares, as the septal framework, if it be possible to obtain the desired result by operation on the soft tissues of the turbinals.

The effect, which I hope to be able to show, of the normal or abnormal action of this little portion of the respiratory vestibule, sometimes even as far as the bronchioles, is another sample of the great interdependence of the different portions of this wonderful physical system of ours.

From the very thorough researches of Lacoarret into the embryonic formation and histological structure, we ascertain that it is far different from any of the remaining nasal tissues. The bony framework of this turbinal body is an entirely separate bone of the skeleton—the others are processes of the ethmoid; while the soft tissues, we are informed, are made from the embryonic

buccal cavity, and not, like the remainder of the nares, from a reduplication of the olfactory crypt. For this reason, we find these tissues much resemble those of the mouth, the mucous membrane containing muscular fibers, follicles, and glands. These latter are situated at the posterior extremity, and are of the lymphoid variety, similar to the tonsils—forming one portion of Warburg's ring of lymphoid tissue, surrounding the entrance of the nose and mouth into the nasopharynx and pharynx respectively; and, on account of their large number in this location, may almost as Scheppegrell says, be designated the nasal or turbinal tonsil. As the effect of the nervous supply will not be considered in this paper, it need but be mentioned that it lacks any terminal filaments of the olfactory nerve, while the sensory are similar to those of the rest of the nasal fossæ. But we may recollect that the nasal reflexes, affecting respiration in particular, such as cough, dyspnœa, or asthma, come from the nerves distributed to this body almost exclusively.

Knowing, as we do, that the respiratory portions of the nares are equally the inferior and middle meatuses—this body separating these channels, therefore entering to a great extent into the formation of both—we see that it is placed in the most advantageous position to modify the inspired air. And in what manner does it do so? On account of its extended surface, and the large size of the venous sinuses contained therein, it performs a considerable part of the heating and moistening of the air inspired through the nostrils. Just here it may be well to mention that it is usually conceded that the air inspired through the nares is about nine degrees warmer when reaching the larynx than if the same entered *per oram*. The third office of this body is to produce an antiseptic or germicidal mucus with which to purify the inspired air; this is done by the modification of the mucus by the admixture of the secretion from the follicles and lymphoid glands in its structure. Of all the nasal tissues, it is believed that that of the secretion from the inferior

turbinated possesses exclusively this specific property. And it stands as a kind of bactericidal sentinel in the midst of the inspired air.

As we all recognize that nature usually endeavors to augment the functions of an organ commensurately with its physical requirements, and we probably have all noticed the enlargement of the inferior turbinated on the concave side of a deflected septum, not accompanied with thickening of the mucosa or other catarrhal symptoms on that side of the nose—is it not reasonable to consider that it has enlarged normally, in order to increase its facilities to heat, moisten, and purify the greater column of air which is allowed to pass through the enlarged nares consequent upon the deflection? It is what I should denominate a compensatory hypertrophy. While an equal-sized turbinated in a naris of normal shape and size would be accompanied by or probably causative of decided catarrhal symptoms.

Furthermore, after this turbinated has been totally removed by the spokeshave, as, is or has been a favorite operation in England, Mr. Wyatt Wingrave has very frequently found re-formed on the stump of the turbinal, what he calls a “pseudo-turbinal” possessed of “perfectly healthy and normal mucous membrane, complete in every detail.” Was this not an effort of nature to replace a useful organ?

The total ablation of this body has in many cases been followed by atrophic catarrhal condition of the pharynx and nasopharynx and predisposition to acute catarrhal attacks of the mucosa lower down.

Because of its tissues histologically resembling more those of the digestive tract,—it possessing adenoid glandular tissue, etc.,—it is frequently affected by similar conditions and at the same time as the alimentary canal.

During functional diseases of the digestive organs it is sometimes hyperæmic and enlarged.

Several other conditions affect it which do not influence the other nasal tissues. First, on account of the contained

muscular fiber and highly developed venous sinuses, it frequently is noticed to be inflamed and swollen during rheumatic and gouty attacks, because the causative factor, the uric acids, irritates the venous sinuses.

Faulty hygienic surroundings act upon it through its lymphoid tissue in like manner as upon the tonsils.

Through two channels it is diseased or inflamed and swollen by the excessive use of tobacco and alcohol; first it sympathizes with the gastric disturbance set up by them and, secondly, they paralyze the muscular coats of the blood vessels here as elsewhere.

Then occasionally they are enlarged in consequence of interference with the general circulation, or from functional derangements of various organs.

Now we come to the local causes of hypertrophy, and we find that the local irritation of the pressure of a spur, ridge, deflected septum, or polypus is responsible for some cases. And Dr. C. E. Rice of this city attributes severe posterior hypertrophies to the malposition of the turbinated downward, allowing the dependent edge to rest upon the floor of the nares. This, he claims, so interferes with the circulation that it causes the offending posterior hypertrophy.

From these foregoing considerations what conclusions shall we deduce? This: When on a rhinological examination of endorhinitis catarrhalis with hypertrophied inferior turbinateds, do not at once conclude that the turbinated is the primary causal factor—it may be the intermediary; see if one of the local irritant or distant functional troubles is not the initiatory factor. After rectifying the other causes then we can judge if any, or how much, of the hypertrophy needs reduction by direct surgical measures upon the turbinated.

We think that the failure in making permanent reduction of these hypertrophies frequently is due to not individualizing the cases in which we operate alone; we remove the local manifestation, but leave the prime cause, the local irritation, or distant cause, untreated.

In the management or treatment of inflammation and hypertrophy of this body first search for any local irritants, as enumerated above, and remove them; then proceed in like manner with the distant or functional causes. The consideration of the manner in which these are best accomplished is without the field of this article.

For the actual surgical treatment of this body, as we may infer from the foregoing, the best method is that which obtains the desired reduction in size with the least destruction of the vital or useful tissues.

Different methods are applicable in accordance with the different tissues or localities principally implicated. In an article of this scope, I will only give in detail those with which the author obtains the best results—others will merely be mentioned.

If the bone itself form most of the enlargement, and this extends almost the entire length of the inferior edge; make an incision with bistoury through the soft tissues of the anterior extremity, and then remove the dependent edge of bone submucously with the smallest-sized electric trephine. This removes a small portion of the bone and at the same time causes cicatricial contraction of the overlying soft tissues similar to transfixion, mentioned below. If the bone be enlarged in its lateral diameter, bulging toward the septum, a portion can be planed off with a small electric drill entered at the anterior extremity, similar to the above, but on the plane of the offending hypertrophied internal surface of the bone.

If it be the vascular portion dilated, which will be shown by very great temporary reduction in size by application of cocaine, we consider what is called turbinal transfixion the best. To perform this a straight, sharp-pointed platinum electrode, heated little more than cherry-red, is entered at the anterior extremity of the swollen body and passed along the inferior edge of the bone as far back as desired; this destroys some of the venous sinuses and inflames the periosteum, thereby binding the remainder closer to the edge of the bone. The foregoing is when enlargement is principally in lower part of turbinal.

If the main swelling be lateral then pass the electrode along the inner surface of the bone. Some will say seldom do we find swelling in one portion of the body to the exclusion of another. So it is; and that a double transfixion will be necessary. Not so; there will be found in almost all cases a sufficient contraction in the lesser portion of the swelling from the transfixion in the greater. In the majority of cases a single transfixion is sufficient, but it requires ten days to two weeks to ascertain the full amount of benefit to be obtained from a given application.

This transfixion I consider preferable to the usual mode of linear cauterization of the mucosa along the whole length of the body, or the multiple puncture with pointed electrode from surface to periosteum; because both of the latter destroy considerable mucous membrane and its contained mucous glands. And the punctures occasionally leave small pits in which the mucus may collect and decay. There is here, as everywhere, an exception to this rule, when there is a chronic hydrorrhœa, that is, a chronic, profuse, rather thin mucous discharge; I believe the destruction of some of the mucous gland rather beneficial, and then one of the latter procedures would be preferable.

Another method, even more conservative, which has only lately been brought to public notice by Dr. Delevan, is the transfixion of the turbinal with a very fine, straight, sharp-pointed bistoury, exactly similar to the electric transfixion above; and as it is slowly removed twist or revolve it in the tissues, thus breaking up some of the venous sinuses causing cicatricial contraction, but with less destruction of the venous sinuses, he claims.

When the posterior extremity is hypertrophied, that is, the glandular portion, the electro-puncture seems to give the best results. This is done with a slightly curved pointed electrode, and one or two punctures as near the center of the mass as possible usually suffices.

The reduction by chemical escharotics, as chromic and trichloracetic acid, etc., is not as satisfactory; because the diminution for each single application is less than the

electric transfixion, and especially so in proportion to the amount of destruction of mucous membrane.

Some claim that in pure subacute vascular hypertrophy a favorable result will be obtained by merely reducing the usual attending catarrhal condition by cleansing with a simple aseptic nasal wash.

Then there is a hypertrophy or swelling of the anterior extremity which, I think, is frequently overlooked; that is, one underneath or on the outer side, situated between the anterior extremity of the turbinated and the outer wall of the nares. Upon ocular examination the turbinal frequently appears perfectly normal, and it is only on searching for it by probing that we find the opposite mucous surfaces in contact. The symptoms directing our attention to it are usually ocular, those which are caused by the partial or total occlusion of the lachrymal duct, or those reflex conditions of the eye due to irritation or pressure upon the sensory nerves around the mouth of the lachrymal duct; such as conjunctivitis, inflammation of lachrymal duct, œdema, pain under eyes, etc.

For the removal of this the electro-cautery seems to be contra-indicated; because the two surfaces are so near together a synechia might be very easily formed by burning—leaving a condition even worse than that already there. So it is best to remove with cutting forceps a small portion of bone and overlying tissues.

Beside the above there are numerous other methods of operating, which probably are best adapted to some special forms of hypertrophy; but to which we have seldom resorted—such are electrolysis, the chisel, saw, conchitome, tubular scissors, spokeshave, etc.

Strange as it may seem, I think that this latter, the spokeshave, has done as much as any one thing for conservatism in this line. Because the ill effects of the total removal of this body, as this instrument accomplishes, are quite noticeable, it is the extreme that has caused the revulsion.

ABSTRACTS FROM CURRENT LITERATURE.

Gleitsmann, J. W.—Report of Progress Made in the Treatment of Laryngeal Tuberculosis Since the Last International Congress.—*Jour. Lar., Rhin. and Ot.*, December, 1897.

The author says the period when the treatment of laryngeal tuberculosis is to be considered a *noli me tangere* has passed never to return. "We must not forget, as Semon appropriately says, that it is merely a local manifestation of a general infectious process."

The treatment may be divided into three chapters: the medical, local, and surgical treatment—although a combination of two or of all three methods is often advisable and necessary. With medicine he endeavors to improve the general and pulmonary conditions. The injections of antiphthisin, antitubercular serum of Paquin, for laryngeal tuberculosis were rather disappointing. The two drugs of greatest benefit for topical treatment he considers lactic acid and sulphuricinate of phenol. Other topical applications mentioned are: injections of menthol in olive oil, tracheal injections of creosote, guaiacol, benzoniol, and euophen, application of five to twenty per cent. solution of parachlorophenol in glycerine, enzymol—a valuable auxiliary to curette and lactic acid.

The surgical treatment comprises: (1) incision; (2) curettement; (3) submucous injection; (4) electrolysis; (5) galvano-cautery; (6) laryngotomy; (7) laryngectomy; (8) tracheotomy; and (9) intubation. Of these curettement is of most interest, and becoming considered more favorably this last year. Reason why curettement is slow to find recognition is the frequent impossibility to eliminate the almost always concomitant pulmonary disease, and second the difficulty to remove all the diseased

tissue and prevent relapses. Answers to first objection, that we should operate to remove one focus of infection and increase ability for nutrition, and second cannot be sustained if the cases are properly selected. Indications for curettement are: (1) in cases of primary tuberculous affections without pulmonary complications, thereby preventing extension to lower air passages. (2) in cases with circumscribed ulcerations and infiltrations of the larynx; (3) in cases with dense hard infiltrations of the arytenoid region of the posterior wall, also of the ventricular bands, tuberculous tumors of the epiglottis; (4) in the incipient stage of pulmonary disease, with but little fever and no hectic symptoms; (5) in advanced pulmonary disease, with distressing dysphagia resulting from infiltration of the arytenoids, as the quickest means to give relief.

The contra-indications are: (1) advanced pulmonary disease and hectic; (2) disseminated tuberculosis of the larynx; and (3) extensive infiltrations, producing severe stenosis, when tracheotomy is indicated, or laryngotomy can be taken into consideration. Technique of operation is facilitated by Hering's rotary double curette. Single curettement is seldom sufficient.

Submucous injection of lactic acid is satisfactory, and ditto of creosote, beneficial. Under electric treatment belongs cataphoresis introduced by Scheppegrell of New Orleans, who claims for it the following advantages: (1) that there is no real destruction of the tissues nor laceration of the surfaces; (2) that there is absolutely no reaction, no hemorrhage; (3) that this method does not demand the high degree of skill required for curettement, and is especially simple when used with the antiscopes; and (4) that it is applicable to all cases of laryngeal tuberculosis. Laryngotomy gives forty per cent. of practical cures.

PALMER.

Stillson (Seattle).—Experiments on the Eustachian Tube by Means of the Tongue Thrust into the Nasopharynx.—*Laryngoscope*, July, 1897.

In another paper the author has described a method of cleaning and treating the nasopharynx by means of the tongue thrust behind the palate, a proceeding said to be not difficult to teach the patient. By the aid of this maneuver he proceeds to investigate some questions as to the patency of the eustachian tube at

different times. A long debated question is whether the eustachian tube is normally open throughout its entire length. Hammerschlag answers as follows (from experiments made with a modification of Mach's instrument): "The membrana tympani exhibit movements coincident with the systole of the heart": "The membrana tympani moved during quiet respiration, in all cases during the inspiration, outwardly; during expiration, inwardly. During quiet respiration through the mouth these respiratory movements are less extensive."

Consequently, "the tympanic cavity openly communicates in a normal state with the nasopharyngeal cavity." This is explained by saying that the expiratory current acts as a syphon drawing the air out of the tympanic cavity and the membrane in. The respiratory current enters so much easier on account of the lessened pressure.

The writer objects to this, that the air in the nasopharynx is condensed during expiration and rarified during inspiration. That the inspiratory current is directed toward Luschka's tonsil, and not toward the eustachian tube, as may be proven by placing a piece of gauze moistened with iodide of potassium over the tonsil and breathing in a nebulized solution of starch, the starch being found in the region of Luschka's tonsil. If a manometer is seated in the ear, while the jaws are opened wide and the base of the tongue drawn down as in yawning, so that eustachian is felt to be open, the index rises in expiration and falls in inspiration. If the orifice be closed the extensive movements of the index stop, and the limited motions noted by Hammerschlag are returned. These latter motions, therefore, have no connection with the patency of the tube and must be due to something else, probably blood pressure. The pharyngeal orifice of the tube may be seen to be open, but experiment shows it to be closed; therefore the closure must occur at some other portion of the tube—probably the isthmus.

The fact that the inflation of the middle ear by means of a catheter is more easily accomplished during deglutition is due to the closure of the eustachian orifice around the catheter during that act. In Politzerization with an air pressure of only two or three pounds the air is felt to enter the ear at first, but during the second stage of swallowing the entrance of the air is felt to cease.

In Nicoladoni's case, where a hematoma located in the orifice of

the eustachian tube was seen to sink into the tube during swallowing, this fact appears to show that the tube was closed during the act, for if the mouth of the tube were more widely opened during the act the tumor would gravitate outward.

In Politzer's manometric experiments the author believes the initial positive fluctuation is due to closure of the eustachian tube, and not to condensation in the nasopharynx. In order to eliminate numerous conditions which may cause fluctuations of the index, a swallow of water is taken in mouth and the base of tongue and palate raised to the highest point, and there held without breathing until the fluid in the manometer is quiet; then the nostrils are closed and deglutition, allowed to proceed. The index then shows a slight positive and a larger negative fluctuation. The positive fluctuation cannot be owing to a nasopharyngeal condensation, for the soft is at its greatest height and immediately begins to descend. This may be proved by placing a manometer in one nostril, and carrying on the experiment as before. At the time of positive fluctuation there is no change in the nasal manometer. By placing the tip of the tongue in the orifice of the tube, the writer can feel a few bubbles of air escape just before the fluctuation of the manometer. He therefore concludes that the condensation takes place in the tube itself, and is caused by the closure and narrowing of the tube. The negative fluctuation is caused by the descent of the palate and rarefaction of the nasal air, which, with nostrils closed, is sufficient to drag open the eustachian tube and produce a rarefaction in the middle ear. With the nostrils open this does not take place.

In the tuning fork test the writer claims that by closing the orifices of the tube by the tip of the tongue the tuning fork sounds much louder, hence the fact that a tuning fork held before the nose sounds louder during deglutition would prove that the eustachian tube was closed rather than open during the act of swallowing. That the increased sound is due to the greater resonance of the nasal chambers, due to the closure of the pharynx. The writer sums up by saying that we may, by means of the tongue thrust into the nasopharynx, feel the pharyngeal orifice of the eustachian tubes normally open; we may feel bubbles of air escaping from the tube in the act of swallowing, proving the condensation of air in the tube; we may feel in the middle of the act of swallowing the belly of the palato-tubal

muscle drawn up against the mouth of the tube ; we may feel that muscle, together with the muscles of the tongue, palate, and pharynx, closing the pharyngeal orifice of the tube, pressing it into the fossa of Rosenmüller; we may feel in the latter portion of the act of swallowing the palato-tubal muscle relax and the restoration of the other muscles to their former state, restoring the normal patency of the pharyngeal orifice of the tube.

DEADY.

Foster, Hal.—Report of Case of 207 Screw Worms Taken from Nose.

He considers the best agents for destroying worms to be chloroform, weak solution of formalin, campho-phenique, and cleansing with H_2O_2 .

Dundas Grant.—Two Cases of Paralysis of Left Vocal Cord of Alcoholic Origin.—*Jour. of Lar., Ot. et Rhin.* October, 1897.

First case : Clergyman, æt. forty years. Sudden onset of partial aphonia, commencing at service, long continuous, complete immobility of left vocal cord, no specific history ; previously had left-sided sciatica, with still a little pain accompanied with considerable anæsthesia of skin of affected limb. The whole indicative of left-sided neuritis. There were no signs of locomotor ataxia ; nor indications of lead, arsenic, or mercurial toxæmia ; therefore considered of alcoholic origin. Abstinence from stimulants, rest, and tincture of strychnine cured.

Second case : Middle-aged woman. Complained of obstinate, fatiguing cough ; examination showed well-marked paralysis of left cord, and very slight bronchial catarrh,—no indications of syphilis or tuberculosis ; the gastric symptoms of decided nausea ; loss of appetite in morning and subjection to frequent bilious attacks directed attention to alcoholic excess. Patient in habit of taking considerable brandy. Abstinence from stimulants, substitution of spir. am. arom., and temporary use of codeia pastilles cured in about five weeks.

Concludes that these were probably cases of peripheral neuritis of left inferior laryngeal nerve of alcoholic origin.

PALMER.

Kallofrath, O.—Removal of a Piece of Bone from Right Bronchus, per Via Naturale, with Direct Laryngoscopy.—*Münch. med. Woch.*, September 21, 1897.

Clinical report: Fragment of bone swallowed while eating pork hash. Usual symptoms ensued, but gradually disappeared to great extent. On account of lateral curvature of trachea not even the bifurcation could be seen with laryngoscopic mirror. Subsequently the corpora adventitia was discovered in right bronchus by use of Kirstein's direct laryngoscopy (autoscope). The patient bearing the examination very well, a Mirulicz-Rosenheim œsophagoscope was passed through the larynx into upper part of trachea and with long tubo forceps, especially made for case, the bone was removed. After one or two small pieces were broken off in extraction, the main piece removed measured 17 by 14 by 8 millimeters.

PALMER.

Thompson, Archibald G.—Complete Blindness Due to Acute Poisoning from Overuse of Essence of Jamaica Ginger; Recovery Followed by Toxic Amblyopia of the Ordinary Chronic Form with Eventual Atrophy.—*Ophth. Record*, November, 1897.

The patient was a male, aet. thirty-two; a sailor; parents both dead, did not know causes of their death; never had any serious disease, absolute denial of specific venereal trouble; never a steady drinker, had been moderate in the use of tobacco. Eyesight always good until December 22, 1896, when he came ashore from a cruise and, with a party of friends, being unable to procure whisky, became intoxicated on essence of Jamaica ginger, taken as whisky is with water. He remained intoxicated for two days, estimating in that time to have taken about a quart and a pint of the Jamaica ginger. His immediate sensations upon recovery were similar to those of a bad alcohol debauch—headache, nausea, etc.

On the evening of the fourth day he noticed that everything appeared hazy and that his vision was failing. Also some slight photophobia. The next morning he could not see a flame held directly before him, but had sufficient peripheral vision to find his way about. On the following day his light perception entirely disappeared, and he remained completely blind for seven

days, when vision gradually returned from the periphery toward the center, until he was able, with great difficulty, to read very large print. His recovery to this extent occupied a period of four weeks, when the condition remained stationary for about three weeks longer, at the end of which time vision again began to fail, but very slowly. At the date of examination, three months and a half from first taking the drug, he had as yet had no treatment, and the conditions present were as follows: Cornea and conjunctiva normal—pupils slightly dilated, but reacting normally to light and accommodation. R. V.—fingers at 1 metre—L. V. = $\frac{1}{100}$ Eccentric. Ophthalmoscope showed media clear, disc very pale, few capillary vessels present; the lower and outer quadrant of the disc, the site of the papillomacular bundle of fibers, was completely atrophied and of a greenish-white color—fundus otherwise normal. There was a well-marked physiological cup and no signs of previous papillitis. No evidence of any cerebral or spinal trouble. This patient reported that he had heard of several other cases in which Jamaica ginger was the cause of defective vision, and that its use is very common in places where whisky cannot be obtained.

The author concludes that the presence of foreign substances in spirits renders them more liable to produce toxic conditions.

DEADY.

Root, Eliza H.—A Case of Nasal Obstruction in the New-born.—*N. Y. Med. Journ.*, May 8, 1897.

The patient, an infant which died at the end of the first week of life, was noticed soon after birth to be quite cyanosed, and the following day the mother stated that it had not been able to take the breast. Investigation revealed the fact that the child was unable to breath through the nose. The mucous membrane of the pharynx was found to be congested, and there was little or no discharge of mucus, and none of muco-pus from the nasopharyngeal cavity or from the nares. In the effort to breathe the uvula, with the arches, was drawn backward and the pillars of the fauces relaxed so as to almost close the pharynx as if paralyzed. *Post-mortem* three or four hours after death showed in the right nasal cavity the inferior and middle turbinated bodies greatly enlarged and engorged with blood, completely occluding the nasal passage. The superior turbinated body appeared nor-

mal. In the left nasal cavity the turbinated bodies were congested but not so enlarged as to occlude of themselves the nasal passage.

The author concludes that during life the engorgement of the enlarged turbinated bodies was necessarily greater than *post-mortem*, and pushed the soft nasal septum against those of the left nasal cavity, thus effectually occluding both nasal passages.

PEARSALL.

Woodward, Jno. F. — Intracranial Complications, Following Acute Suppuration of the Middle Ear.—
New York Med. Journ., October 9, 1897.

Male patient, aged forty years, healthy and robust all his life; weight 185 pounds. A total abstainer, no specific history, and a man of regular habits. He had received a blow upon his head about six weeks before, but did not remember upon which side. It was sufficient to knock him down, but did him no apparent harm. Though a perfectly well man he had not had a feeling of well being for several weeks. Urinary examination showed nothing except excess of urates. On the morning of his attack he was helping a servant lift a heavy barrel, which he suddenly dropped, saying, "I am going to die; I have burst something in my head." He was found resting quietly, but suffering much discomfort at intervals from a throbbing, shooting pain in the right ear. He had just emerged from a chill. Examination revealed bulging and congestion of the tympanic membrane. A few hours later the ear began to discharge and he felt better.

He stated that he first had a sensation of something loose in the right temporal bone, and several hours afterward had the chill. His wife furnished the information that he had acted peculiarly for the last two weeks, being morose and irritable at times, somewhat absent-minded, restless at night, and had had a very decided flushing first of the right, then of the left side of face.

The right side of face was decidedly congested, the discharge was free, thin, and mucopurulent in character and streaked with blood. On April 14, the day following the attack, the temperature was normal and the discharge free; very little discomfort, and the patient was able to be out. For the next four days he steadily progressed, and on the morning of April 18 he was in

excellent condition. At 7 P. M. of the same day he began suffering a slight pain in the ear, pain in the small of the back, and temperature 100° F. During the night the temperature rose to 102° and there was slight delirium. Discharge from the ear was scanty. April 19, patient quiet and perfectly conscious, pain in small of back and nape of neck, temperature rising to 102° during the day, at night to 103° , with slight delirium, pain in small of back and back of head, no discomfort about the ear, discharge scanty and purulent, ear kept clean. April 20, found patient quiet and rational, drumhead open, with a slight discharge of pus: no tenderness or puffiness over the mastoid, redness of side of face subsiding, and no pain or discomfort about the ear. He still complained of pain in small of back and nape of neck; temperature during the day from 101° to 103° . He had a fairly good night.

April 21. Temperature 100° ; drowsy; no delirium; no signs of pain; pulse 80; respiration normal; slight discharge from ear, no odor, and redness subsided. A few hours later, patient in a stupor—could not be roused. Temperature 103° , pulse 110. The mastoid was open immediately. When the skin was removed, the peculiar color of the cortex attracted attention. Looking as if a very thin veil covered a network of venous sinuses. A slight tap of the hammer carried the chisel into a mesh of cells filled with venous looking blood. There was free hemorrhage. The scoop passed down $\frac{3}{4}$ inch without finding pus or hard bone, but then struck a very hard plate of bone which was chiseled through to the antrum. No pus was found, the parts being apparently healthy.

The mastoid was then opened freely, but no pus was found. The mucous membrane or periosteum was removed from the floor of the tympanum, extending over to the inner wall and outward to the outer and upper posterior wall. It was thoroughly washed out and little or no pus found.

The wound was packed with iodoform gauze and the patient put to bed. He reacted promptly and for several hours seemed slightly improved, but never regained entire consciousness. In four hours his temperature was 107° , and the pulse could not be counted; coffee ground vomiting; respirations 40, and jerky. Twenty minutes later he died in coma.

The case was diagnosed. Acute leptomeningitis, basilar and

unilateral, extending toward the spinal meninges, the result of direct infection from the middle ear through the petrous portion of the temporal bone, not complicating the mastoid. No *post-mortem*.
DEADY.

Leland, Geo. A.—Nasal Obstruction with Reference to Aural Disease.—*Boston Med. Jour.*, August 26, 1897.

The aural symptoms dependent on such obstructions are : (1) A feeling of pressure in the ear as if it were plugged ; eustachian obstructions cause diminution of twenty-one per cent. of oxygen in middle ear : that equals atmospheric pressure of more than four pounds. (2) Deafness due to fixation of the ossicles from simple pressure on membrana tympani. (3) Tinnitus aurium, pulsating tinnitus probably caused by pulsation of arteries in enlarged and inflamed glandular swelling around eustachian mouth, being conducted to ear by the dense cartilage of tube ; also pulse wave in the ascending pharyngeal artery, as it runs in the side wall of eustachian tube, may be communicated to ear ; hissing tinnitus probably due to capillary circulation in collapsed eustachian ; tinnitus occasionally due to reflex nervous phenomena from encroachment of spurs upon opposing tissues. (4) Pain, usually only in acute obstructions, *e. g.*, acute adenoiditis. (5) Effusion. (6) Discharge. Pain, effusion, and discharge may be due to the mechanical causes, being simple results of the dry cupping in the vacuum produced by the abolition of ventilation.

In eustachian closure the membrana tympani is sunken, of dark, dull, bluish hue, showing no translucency, since there is no air behind it ; the manubrium is foreshortened, the short process is prominent, and the light reflex is either abolished or present usually as a minute bright point. Might be designated the adenoid ear.

The nasal causes are either septal deflection, exostoses, euehondroses, hypertrophies of turbinateds, polypæ, fibroma, etc. Nasopharyngeal cause, lateral pharyngitis, hypertrophic pharyngitis, and, by far most frequent, disease of adenoids.

[If the nasopharyngeal causes are included, to the latter should be added : cicatrices, either syphilitic or traumatic ; abscess ; hematoma of lateral pharyngeal wall ; phlebectasia of eustachian eminence.—ED.]
PALMER.

Wurde mann and Black.—A Report on Holocain as a Local Anæsthetic in Ophthalmic Work.—*Ophthalmic Record*, October, 1897.

The drug is described as "a white crystalline substance, a strong base, feebly soluble in cold water to 2½ per cent. soluble in alcohol, ether, and hot water, fuses at 121° C.; neutral reaction, not changed by heating, although when heated in glass gives off a free alkali affecting glass, making a turbid solution—so should be heated in porcelain; sterilizing by heat is unnecessary, as a 1 per cent. solution is directly bactericidal; solutions are stable, a 1 per cent. solution remaining clear for two months."

Ocular anæsthesia was produced in fifteen seconds with two or three drops of a 1 per cent. solution and lasted from twelve to fifteen minutes. For about thirty seconds after the application a slight smarting was noticed, but no more than from cocaine. This was followed by a sensation of coldness and slight moisture, lasting several hours. There was hyperæmia of the vessels of the conjunctiva, in all cases lasting from one-half to one hour. The cornea was moist and did not desiccate. There was no action on pupil, accommodation, or tension. The advantages claimed for the drug are its non-toxic action in local use, the stability and bactericidal quality of its solutions, the rapidity, completeness, and lasting quality of the anæsthesia, the absence of any effect upon the pupil and accommodation, and its ready absorption, the latter rendering it useful for deeper operations.

DEADY.

Burnett, Chas. H.—Intra-tympanic Surgery—Especially in Chronic Purulent Otitis Media.—*International Med. Mag.*, December, 1897.

Dr. Burnett reports thirty operations for the relief of chronic purulency of the middle ear, in all of which various routine methods of treatments had been employed before resorting to operation. In all the cases but one the patient was etherized, the ear being illuminated by a three-candle-power electric head lamp. All the cases were under careful observation, and so remained long enough for fair conclusions respecting the result of the operation. The attic alone was affected in nine cases, the atrium alone in seven cases, and both in fourteen cases. Marked

ear vertigo was present in two cases. In every instance the operation was followed immediately by decreased discharge, which became less purulent and offensive and more mucous in quality. Total cessation of the discharge, with cicatrization, occurred in fourteen cases, four times in two weeks, three times in one month, five times within two months, once in a year, and once in a year and a half. The hearing was improved in eighteen cases, remained unchanged in eleven cases, the atrium being here the chief seat of disease, and in one case was unrecorded. In twenty-four of the cases a portion or the whole of the tympanic membrane was removed, in twenty-eight the malleus was removed either entirely or partially, and in four cases the incus was removed. The after-treatment consisted of instillations of alcohol, or alcoholic solutions of boric acid or acetanilid so long as granulations were present, after which a $2\frac{1}{2}$ per cent. solution of carbolic acid and water or a 1-6000 solution of bichloride gave the best results.

No case was made worse by the operation even temporarily. Every case was improved more or less.

The author cites the following results to be expected from excision of necrotic ossicles in chronic purulent otitis media.

- (1) Prompt lessening of discharge in all cases.
- (2) Ultimate cessation of the discharge, and cicatrization of the fundus in nearly one-half of the cases, as observed so far.
- (3) Arrest of the advance of caries and necrosis in the drum cavity, aditus atrum and mastoid cells, thus lessening the liability to the occurrence of intracranial lesions of otitic origin.
- (4) Improvement in hearing in more than half the cases.
- (5) Marked amelioration in the general health, especially in those cases presenting symptoms of slight septicæmia from the chronic purulency.

DEADY.

Horne, W. Jobson, and Yearsley, Macleod.—*Eucaïne as a Local Anæsthetic in the Surgery of Throat, Nose, and Ear.*—*Brit. Med. Journ.*, November 27, 1897.

He quotes Dr. Gibb's (Philadelphia) conclusions as follows : (1) Eucaïne is equal to cocaine in its anæsthetic effects. (2) Eucaïne is nearly, if not quite, as effective in reducing engorged turbinateds. (3) Eucaïne is superior to cocaine in that it is much less likely to produce toxic symptoms. (4) Eucaïne is

superior to cocaine in that it produces far less unpleasant subjective symptoms, and especially is this true in the pharynx. The hydrochloride salt is used. Two per cent. solution for examination, ten per cent. for operation; boiling is not detrimental. Anæsthesia is obtained sufficient to perform galvanocautery operations or turbinectomy. "So far we have not met with a case in which the drug *per se* influenced the cardiac action." Neither have they experienced the secondary hemorrhage frequently occurring after cocaine anæsthesia for operation. "So far in our experience with eucaine we have not met with a case in which a single symptom supervened in the least way suggestive of a toxic effect of the drug." Above conclusions from one hundred consecutive clinical cases. PALMER.

Pratt, Frank P.—What are the Functions of the Rods and Cones and the Pigment Epithelial Layer of the Human Retina?—*Medical Record*, August 28, 1897.

In an article on the above subject, the following hypotheses are offered:

(1) That the cones alone are the terminal cells of the optic fibers in the human retina.

(2) That the rods are supporting tissue to the cones, their outer segments practically forming a part of the pigment epithelial layer.

(3) That the tenth, or pigment layer is that in which light vibrations are changed into nerve stimuli.

After a résumé of the microscopical anatomy of the parts, the following conclusions are presented in support of the first and second proposition:

(1) That the cones alone have been demonstrated to be directly connected with the filaments of the optic nerve.

(2) That no such claim is made for the rod; in fact, the base of the rod is known to terminate in a bulb, and approximation is its only relation to the nerve filaments.

(3) That the cone is mechanically irritated by converted light stimulus, as shown by its power of contraction and extension under that stimulus.

(4) That converted light stimulus has no mechanical effect upon the rod, that its close relation to the base of the epithelial cell remains unchanged under its influence.

(5) That the only change noted in the rod cell is that which occurs in the bleaching and reproduction of the so-called visual purple, which has its exclusive seat in the outer segment of the rod cell, and this bleaching seems to be effected by the action of the luminous vibrations themselves, and not by the proper nerve stimulus. Light vibrations as such are not excitors to the terminal cells of the optic nerve.

(6) That the cones alone occupy the position of most acute vision.

(7) That the rods are not necessary to acute and perfect vision.

(8) Because in central scotoma the disease involves only that portion of the retina which has to do with acute vision, namely, the macular region, yet a cross section of the optic nerve where it enters the bulb shows an accompanying atrophy of nerve filaments, which occupy a sector-shaped space with base out and apex toward the center and make up nearly or quite one-third of the total nerve filaments (Fuchs). When we consider what a small part of the retinal surface the macular region occupies, and how insignificant numerically the cones of this region are, compared with the combined rods and cones of the extra-macular region, it not only adds weight to the belief that each cone in this region has an individual nerve fiber but also to the fact that each cell element of the extra-macular region cannot have an individual nerve fiber, nor one fiber for seven cells, as estimated by Selzer and Krause. These authorities estimate the cones at 7,000,000; Becker estimates 13,000 in the macula lutea. The rods are much more numerous, being estimated as high as 130,000,000 by Krause. Selzer and Krause estimate the number of measurable fibers of the optic nerve at 425,000. Now taking out the 13,000 fibers distributed to the macular cells, there remain 412,000 fibers to be distributed to 137,000,000 extra-macular cells. If these were distributed to both the rods and cones, there would be one fiber to 332 cell elements. If to the rods alone, one to 301. If to the cones alone, one to about 17. These estimates furnish additional evidence that the cone cells alone receive filaments of the nerve.

(9) That the normal position of the cone is at right angles to the external limiting membrane and the pigment epithelial layer. That this position can thus be maintained outside of the macular

region only by appropriate supporting tissue. In the macular region each cone is a support to its neighbor, therefore no rods are necessary. In the extra-macular region, the cones become farther and farther apart toward the peripheral portions of the retina. They can no longer support each other. Therefore rods appear, and with the protoplasmic process of the epithelial layer, and the modified lymph filling in the intervening spaces, the rods which in the macular region form a single layer around each cone gradually increase in number until, in the region of the ora serrata, each cone is surrounded by three or more layers of rods; the out segment of the supporting rod, as it dips deeply into the pigment process of the epithelial layer, thus becomes practically a part of that layer.

(10) That in proportion as the cones increase in number over a given area, vision increases and *vice versa*. Thus the cones within the macula lutea are many times more numerous than in any other equal space on the retina, therefore, more terminal filaments being irritated, sight is more acute.

In support of the third proposition that the tenth retinal layer is that in which light vibrations are changed into nerve stimuli, the following considerations are offered:

1. The pigment epithelial cells increase in size from the region of the fovea, where they are the smallest, to the region of the ora serrata, where they reach their maximum size, thus coinciding with the decreasing number of cones from center to circumference, so that it is probable that when the ninth and tenth layers are in their normal position, each cone points to the center or nucleus of each epithelial cell.

2. The peculiar, yet significant, associated action of the epithelial pigment and the cone cell, under the influence of light stimulus; as the pigment advances within the epithelial processes, the cone retracts and *vice versa*, their relative positions being little changed.

3. The position of the cone is strong evidence that the image is not formed upon this layer. Nature is a conservator of forces. Then why does she not turn the cones toward the source of light if this layer is the necessary surface upon which the image is cast, instead of turning them in the opposite direction? In the one position the image would fall directly upon the percipient surface; in the other the light rays pass through the nine different retinal

layers to accomplish the same purpose, if the accepted theory is true. Thus it would seem that "vibrations of luminous ether" must pass unobstructed through the various retinal layers, including the cones, until they are focused upon the tenth layer, which point is a "murky veil" at the focal point of the normal eye, fixed between the delicate terminal cells of the optic nerve and the choroid coat. It is the ground-glass plate of our living camera upon which the images in our visual field are spread in all their various colors, and in which, in a manner not yet fully understood, light vibrations are transformed into nerve stimuli, and from which comes the normal stimulus of the ocular fibers.

DEADY.

Simple Method for Preventing the Dimming of Mirrors (first used by Mr. Geo. Wallis, Dental Surgeon to the Central London Throat and Ear Hospital).

Rub the glasses thoroughly with ordinary dry soap; the film of soap left on the mirror is then wiped off by soft rag or handkerchief, then the breath will not cloud the mirror. The same method will keep eyeglass from clouding when drinking hot liquids, or when going from a cold to warm, moist atmosphere, as from street to the sick room in winter.

PALMER.

Morris, Hy., F. R. C. S., Eng.—Proper Treatment of Cut-Throat Wounds by Immediate Suturing of All the Divided Structures.—*The Lancet*, June 5, 1897.

He mentions that "I have ventured to depart from the time-honored practice of leaving cut-throat wounds open to heal by granulation and cicatrization, and have sought, by the liberal employment of buried and superficial aseptic sutures, to bring about immediate results." Proceeds as follows, using silk sutures throughout: Anæsthetize—"even quite small bleeding should be secured"; scrupulous antiseptics—(1) edges of windpipe exactly adjusted without sutures penetrating mucosa, and near enough together to make air-tight, may pass through or around cartilages; (2) fascia covering larynx or trachea united with another set of sutures, these also close together, to assist in making air-tight; (3) in like manner the infra-hyoid muscles, the deep fascia, and integument united. Small drainage tube may be inserted in each end of wound. The advantages are: heal

quicker, ingest food *per via naturale* sooner, can articulate soon after operation; very slight possibility of septic bronchitis or pneumonia, therefore far less mortality. [In another English article R. G. Hogarth recommends for the deep sutures in trachea and overlying fascia, chromacized catgut or silk, and for the superficial horsehair or wormgut.—ED.] PALMER.

Botey, Dr. Ricardo (Barcelona).—Indications for Surgical Treatment in Tuberculosis of the Larynx, and What Results Might be Expected from It.—*Paper read at Twelfth International Medical Congress, Moscow, August 19, 1897.*

Contra-indications: (1) acute and subacute forms; (2) where there is general affection of whole organ, with infiltration and ulceration, and that whether there was progressive disease going on in the lungs or not. Indications for surgical interference where (1) there was lupus, a limited affection of the larynx, with granulations; (2) polypoid formations; (3) in unilateral infiltrations; or (4) when the disease was probably located at the entrance of the larynx, and it might even be where one-third or half the larynx was affected, unless the indications in a particular case otherwise forbade it. Electrolysis slow and unsatisfactory; galvano-cautery most useful in lupus. PALMER.

Bates, W. H.—Painless Eye Operations.—*New York Med. Jour.* October 16, 1897.

The writer has been using the suprarenal extract, in conjunction with a solution of cocaine, in those operations where cocaine alone fails to produce sufficient anæsthesia. He claims to have been very successful by this method, and cites cases of tenotomy of the recti muscles, inflammatory glaucoma, and lachrymal operations, which the procedure has been entirely painless. He obtains the dried glands from Armour & Co. of Chicago. A solution of the extract for use is prepared by mixing about ten grains of the dried, powdered glands in $\frac{1}{2}$ dram of water, and filtering. It should be prepared just before the operation, as it soon spoils when exposed to the air at the ordinary temperature. Drugs should not be mixed with it, as cocaine, carbolic acid, bichlorate of mercury, and many other substances interfere with its action in the eye. The extract is neither irritating nor poison-

ous, having only the properties of an astringent, and it is the most powerful astringent that is known.

He first uses the solution of the extract to reduce the hyperæmia of the parts, after which cocaine has its full effect as an anæsthetizer. Thus, in making operations upon the lachrymal canal, a solution of the suprarenal extract is syringed through the puncture, and when this has reduced the congestion it is followed by a solution of cocaine used in the same manner, which then produces its proper effect. Where the operation is prolonged, the anæsthesia is maintained by the alternate instillation of solutions of the extract and of the cocaine. DEADY.

Goldstein, M. A.—The Texas Screw Worm, and Its Invasion of the Nasal Cavities.—*The Laryngoscope*, December, 1897.

The insects most frequently infesting the human being are (a) the common blow fly, *Calliphora Vanitoria*, and (b) so-called Texas screw worm, *Comptosomyia (Lucillia) Macellaria*. The first habitat of latter was Mexico and South America, but now "it occurs everywhere, from Canada to Patagonia. The fully matured larva or maggot is three-fourths of an inch long and about one-eighth inch in diameter. The body, of a creamy-white color, is made up of segments, while between each segment is a ring of bristles which causes the maggots to resemble a screw."

In man they most frequently attack the nares and auditory canal, and are particularly attracted by ozena and malodorous otorrhœa, as "it is one of the main characteristics of this fly that it is readily attracted by the odor of decayed animal and vegetable matter, and feeds very voraciously upon them until satisfied." Gives report of case in which he removed over five hundred eggs and larvæ at different times, in different stages of development, some of which worked their way into the tissues of the septum, causing abscess. Every antiseptic was tried to stupefy or kill the larvæ, without avail. He found by experiment that the fully developed maggots lived four minutes in pure carbolic acid, and fifteen minutes in strong turpentine; chloroform was most satisfactory, as exposure of thirty seconds to the atomized vapor invariably killed the worm. PALMER.

BOOK REVIEWS.

THE AMERICAN YEAR BOOK OF MEDICINE AND SURGERY, being a yearly digest of scientific progress and authoritative opinion in all branches of medicine and surgery, drawn from journals monographs and text-books of the leading American and foreign authors and investigators, collected and arranged with critical editorial comments by Sam'l W. Abbott, M. D.; Jno. J. Abel, M. D.; J. M. Baldy, M. D.; Chas. H. Burnett, M. D.; Archibald Church, M. D.; J. Chalmers Da Costa, M. D.; W. A. Newman Dorland, M. D.; Louis A. Duhring, M. D.; Virgil P. Gibney, M. D.; Hoover W. Gibney, M. D.; Henry A. Griffin, M. D.; Jno. Guitêras, M. D.; C. A. Haymann, M. D.; Howard F. Hansell, M. D.; Barton Cooke Hirst, M. D.; E. Fletcher Ingals, M. D.; Wyatt Johnston, M. D.; W. W. Keen, M. D.; Henry G. Ohls, M. D.; Wm. Pepper, M. D.; Wendell Reber, M. D.; David Reesman, M. D.; Louis Starr, M. D.; Alfred Stengel, M. D.; G. N. Stewart, M. D.; J. R. Tillinghast, Jr., M. D.; Thompson S. Westcott, M. D. Under the general editorial charge of Geo. M. Gould, M. D. Illustrated. Phila.: W. B. Saunders, 925 Walnut Street, 1898. Pp. 1077.

This valuable work, in praise of which too much cannot be said, has among its many useful attributes one which will be especially appreciated by the profession. We refer to its prompt appearance at the beginning of the year. Covering all departments thoroughly, it is difficult to see how a greater amount of valuable information could be compressed into the space occupied. The editorial comments are clear, concise, and very much to the point. While the general departments are profusely treated, a considerable space is devoted to the specialties covered by the JOURNAL—sixty-seven pages imperial octavo being devoted to ophthalmology, thirty-eight to otology, and thirty-six to diseases of the nose and larynx. The volume is handsome, well printed and bound, profusely illustrated with woodcuts, and contains thirty-three halftone and colored plates. The contributions are

from the pens of world-wide authorities on all the subjects treated.

We note that Remlinger and Schneider have been conducting a series of experiments to determine whether the typhoid bacillus existed in nature outside the human body, and with unexpected results.

In thirty-seven specimens of water drawn from sewers, springs, and rivers, they were able to recognize its existence nine times; of these specimens only two came from regions where an epidemic of typhoid fever existed. In thirteen specimens of dust and earth they found it seven times—once in the dust of a room where typhoid fever had not existed for a long time. Ten patients not suffering from typhoid fever were examined, and in five cases organisms were found in the fæces.

A point worthy of notice will be found in the discussion of the question, "how to disinfect the hand." It is undoubtedly the fact that there is often too much laxity in the methods for sterilizing not only the operator's hands, but the skin of the patient as well. Fürbinger and Freyhan maintain that the hands cannot be completely sterilized by soap water and antiseptics alone; alcohol must be used, and the more employed the greater the cleanliness. They advise scrubbing with a brush, warm water, and soap for at least five minutes, then rinse in sterile water, wash in alcohol for five minutes, and finally rinse in sterile water. They hold that the alcohol is germicidal; that it helps to remove the grease and fat, and so opens up a way for the action of a germicide, and that it removes the epidemic itself, which structure also contains bacteria. Dr. Weir employs the mixture of chlorinated lime and washing soda, which upon the addition of water evolves chlorine gas. He professes to have found great satisfaction in its use. We have personally used the latter, and it seems to meet all requirements.

Dr. Robert Abbe reports a case in which he implanted some rubber tissue under the dura mater. The patient suffered from Jacksonian epilepsy.

Adhesions were found between the dura and the brain, over the arm center. These adhesions were broken up and a bit of rubber tissue was placed between the brain and the dura, and the dura sutured over it. A year has passed and no ill effects are as yet evident.

The X-ray has established a place for itself in ophthalmology, and its use for the localization of foreign bodies in the eye and orbit is becoming universal.

In the choice of operations for the removal of cataract we are still left to follow our own sweet wills. Opinions are still divided between the simple and combined operations.

Extraction of the lens in high myopia is being more and more favorably regarded, and can now be said to be an established method of treatment for this defect.

T. E. Murrell's further trial of scopolamine hydrobromate as a cycloplegic, since his report last year, only emphasizes the commendations he then bestowed upon the drug. In his hands it has proved the ideal cycloplegic, in which opinion he is joined by C. A. Oliver.

Ogneff, after exposing the eyes of rabbits, frogs, and pigeons to a powerful arc light, found that the cornea and conjunctiva were the parts to suffer most, while the retina, contrary to the usual finding, was the least affected.

Darier in a case of cataract with obliteration of the anterior chamber introduced two lance-shaped knives, inversely to each other in the cornea-scleral border, one at right, the other at the left, a little above the horizontal diameter of the cornea. As soon as the points had perforated the cornea they were withdrawn and a cataract knife, curved and sharp on its convex edge, with a *button* at its end, was entered through one of the incisions, brought out through the other, and the cornea incised.

As the result of an application of a five per cent. solution of cocaine to the posterior nares, Shastid witnessed complete amblyopia lasting four days.

Bronner gives the following indications for surgical treatment of diseases of the attic and mastoid, according to Schwartze :

(1) In acute primary or secondary inflammation of the mastoid process, if under antiphlogistic treatment the symptoms of pain, tenderness, and fever do not improve in a few days.

(2) Chronic inflammation of the mastoid process with recurrent attacks of swelling.

(3) Fistula over or near the mastoid process.

(4) Chronic inflammation (purulent) of the middle ear, without apparent affection of the mastoid process, if there are any symptoms of retention of pus, or of diseased bone (pain, fever, etc.), or if there is a cholesteatoma.

(5) Persistent pain over the mastoid process.

(6) Chronic otorrhœa without any symptoms of retention of pus or swelling of the mastoid process, as soon as we have reason to think that the inflammation had spread beyond the middle ear.

According to Leutert, fever extending over several days in an acute otitis media after cessation of first acute stage, free discharge of pus from the drum cavity continuing and also especially in the course of a chronic purulent otitis media, without an acute process, and without great retention of pus in the drum cavity. Continuous high fever is practically an unmistakable evidence of the existence of a sinus affection. The same eminent observer has formulated the following conclusions :

(1) An otogenous pyemia without sinus thrombosis has never yet been observed.

(2) The occurrence of such a disease is so improbable as not to enter into diagnostic consideration.

(3) The varieties of metastases occurring in sinus-thrombosis, both in acute and chronic aural suppuration, is explained by the different quality of the thrombosis, especially whether tubular or solid.

(4) Therefore, immediate surgical exposure of the sinus is advised in every case of empyema of the mastoid process occurring after otitis media, if after the acute stage has passed, and the escape of pus from the drum cavity is ample, fever of 30° C. (102.3° F.) and over sets in.

(5) In recent cases the result of this must be awaited ; if the fever does not abate by the third day, or if after abatement of the fever for a short time the temperature again goes up, either with or without a chill, the sinus should be immediately opened.

(6) If the case has become subacute and high fever has been present some time, especially, however, if any chronic suppuration, without marked mastoid implication or continued high fever for several days occurs, and diffuse meningitis can be excluded by lumbar puncture, then, too, must the sinus already exposed by operation, be laid open. (Exception : when there is perisinous suppuration confined under high pressure which condition can sometimes cause fever, even if not as high as that sometimes caused by thrombosis.)

(7) In young children the diagnostic value of high fever is not so great, but the possible presence of sinus thrombosis must be kept in view.

(8) Isolated thrombosis of the bulb of the jugular vein generally occurs indirectly through the agency of micro-organisms which have passed from the diseased sinus wall, and have found in the jugular bulb favorable conditions for lodgement and formation of a thrombus on the intima.

(9) Exploratory puncture of the sinus is of value only when the result is positive.

A TEXT-BOOK ON SURGERY. General, Operative, and Mechanical, by JNO. A. WYETH, M. D., Professor of Surgery in, and President of the Faculty of, the New York Polyclinic Medical School and Hospital, Late Surgeon to Mt. Sinai Hospital, etc., etc., etc. Third Edition, revised and enlarged. New York: D. Appleton & Co. 1898.

The present edition of Dr. Wyeth's excellent work has been enlarged by about 112 pages over its predecessor, but this statement does not properly convey an idea of the amount of new matter introduced, as a portion of the contents of former editions, which could be spared without disadvantage, has been eliminated in the work before us.

It will be noticed that the subject matter has been to a great degree rearranged; the first six chapters being devoted to surgical pathology, Chapters VII. and VIII. to surgical dressings, sterilization, asepsis and antisepsis, and anæsthesia. Chapters IX. and X. include hemorrhage, wounds, burns, skin grafting, frostbite, furuncle, carbuncle, ulcers, and gangrene. Bandaging is given in Chapter XI., and Chapter XII. is devoted to amputations; Chapters XIII., XIV., and XV. cover the lymphatic vessels and glands, veins, arteries, and aneurism, and the ligation of vessels. In Chapters XVI. and XVII. are given the lesions of the bones and joints, and the operative measures for their correction. Chapters XVIII. to XXIX. inclusive are devoted to regional surgery; Chapter XXX. takes up deformities and their correction; and Chapter XXXI., and last, is devoted to tumors.

Under diphtheria the methods of using the serum therapy are recited, and some statistics of its value are given. In this chapter will also be found a description of intubation. In preparing for operations, we note that while the skin of the patient after being thoroughly scrubbed is washed with ether to dissolve fats, the author does not consider such necessary in the case of the surgeon, as he directs that the hands and arms to the elbows shall

be scrubbed with sterile soap and water and brush until perfectly clean, and immersed in a 1-1000 sublimate solution for several minutes, a procedure which would be deemed insufficient by many surgeons. Welch's method of sterilizing the hands is also given, but no remarks are made for or against it.

Under anæsthesia considerable space is given to cocaine, and Schleich's method of infiltration anæsthesia is described.

The author lays considerable stress upon his "bloodless" method for amputation at the hip joint, by the use of steel needles passed through the tissues as retainers for the rubber tube tourniquet, and cites 69 cases operated since 1890 by himself and others according to this method with a mortality of only 15.9 per cent., which is certainly a favorable showing.

The article on the ligation of arteries is complete, well written, and beautifully illustrated with magnificent colored plates, leaving little to be desired in this branch of the subject. In the chapter on fractures, the Roentgen ray is introduced, and radiographs are given showing the overlapping ends of the fractured bones.

The article on the eye is quite extensive, and includes a brief description of a large number of diseases of the organ and its adnexa, with short directions for their treatment. The various operations are more or less carefully described. In this chapter, however, improvement is easily possible,—for instance, under granular conjunctivitis, no mention is made of the expression of the granules by Knapp's roller forceps, which is the leading method in use at the present time where operative procedure is necessary. The surgery of the ear is exceedingly brief. The treatment of wounds, lacerations, and deformities of the auricle is mentioned, and directions for opening the drum and the mastoid process are also briefly presented, but as the space devoted to the entire organ is only four pages, the directions are necessarily of the most elementary character.

More space is devoted to plastic operations on the face and mouth, a number of methods being described and well illustrated. In the chapters upon the abdomen, however, will probably be found greater changes, and here more new matter has been introduced than in almost any other part of the work, which is excellent throughout, being concise and readable in style, containing a vast amount of information on all subjects pertaining to surgical art. A matter which will attract attention is the large

number of plates contained in the book, these being 938 in number and all good, while many of them are of the highest excellence.

The publisher's work is thoroughly good and substantial in every way.

DISEASES OF THE EYE. By EDWARD NETTLESHIP, F. R. C. S., Ophthalmic Surgeon at St. Thomas' Hospital, London; Surgeon to the Royal London (Moorfields) Ophthalmic Hospital. Revised and Edited by W. T. HOLMES SPICER, M. A., M. B., F. R. C. S., Ophthalmic Surgeon to the Metropolitan Hospital and to the Victoria Hospital for Children. Fifth American from the sixth English edition. With a supplement on Color Blindness by WILLIAM THOMSON, M. D., Emeritus Professor of Ophthalmology in the Jefferson Medical College of Philadelphia. Handsome 12mo of 521 pages, with 2 colored plates and 161 engravings. Cloth, \$2.25. Lea Brothers & Co., publishers, Philadelphia and New York. 1897.

The fact that this little work has been before the American profession for nearly twenty years, and has gone through edition after edition on both sides of the water (the present being the fifth American from the sixth English edition), is a sufficient tribute to its general excellence. The volume is a sort of *multum in parvo*, containing a succinct and sufficient description of the various diseases of the eye, anomalies of refraction and accommodation, methods of examination and treatment, and a description of the important operations, all correctly and properly laid down in a comparatively small space, and at a very low price.

The present volume is only changed from the preceding edition by those additions necessary to bring it up to date, and is well printed on good paper; the illustrations, with the exception of two colored plates, are, as in the former editions, all wood cuts, but in many cases remarkable for their excellence. It is not necessary to recommend this volume; it is well known, and should be in every library on the subject.

NERVOUS DISEASES WITH HOMEOPATHIC TREATMENT. By JOS. T. O'CONNOR, M. D., PH. D., Professor of Nervous Diseases in N. Y. Hom. Med. Coll. and Hosp., etc., etc. Illustrated. New York: Boericke, Runyon & Ernesty. 1898.

Professor O'Connor has given us a book which will be welcomed by students, and which practitioners may read with profit. The work, while not exhaustive (in a book of 416 pages

on Diseases of the Nervous System something must perforce be left out), is condensed description of the diseases of the nervous system as they are known at the present time. Fully up-to-date,—no one who knows the author will doubt that,—and the story told in a plain, simple manner; enough of it to give the student an excellent idea of each disease, and so presented as to be easily assimilated. Enough anatomy interspersed to make the conditions described perfectly intelligible, and at the same time to render the student familiar with the many new terms which have arisen in this branch of medical science. This much has Dr. O'Connor accomplished, and in saying this we believe we are paying him a compliment.

We are disappointed in only one thing respecting this work, and that is that a man so well known as an expert in *materia medica* as the author should not have done himself greater justice on this occasion. A large number of remedies are indeed included in the work, but there is a large and unoccupied field right in this spot in our literature, and it would have been quite possible to make this work as valuable from the standpoint of *materia medica* as Allen and Norton's "*Therapeutics of the Eye*," and, further, Dr. O'Connor was fully competent for the task, had he so chosen to view the matter; still the book as it stands is a good one, and there is as much *materia medica* in it as is usually found in works of this character.

MEDICAL AND SURGICAL DISEASES OF THE KIDNEYS AND URETERS.

By BUKK G. CARLETON, M. D., Genito-Urinary Surgeon and Specialist to the Metropolitan Hospital, Blackwell's Island, New York City. Illustrated. New York: Boericke, Runyon & Earnesty. 1897.

This is a very handy little volume of 250 pages, in which the author has presented the gist of our present knowledge of these organs, giving with great conciseness the ætiology, pathological anatomy, clinical history, and all the known methods of treatment of the various diseases, with a chapter on renal surgery, concluding with the symptoms of all the remedies which have been found useful in the treatment of these disorders.

The book is beautifully illustrated with photomicrographs representing the pathological changes produced in the kidneys by the various diseases, as seen under the microscope. It is well printed on fine paper and handsomely bound, and should fill a place entirely its own.

THE JOURNAL OF OPHTHALMOLOGY, OTOLOGY AND LARYNGOLOGY.

EDITOR.

CHARLES DEADY, M. D.

ASSOCIATE EDITOR,

A. W. PALMER, M. D.

EDITORIAL.

WE publish, in full, in this issue of the JOURNAL, an article from the pen of Dr. E. B. Dench of New York, taken from the New York Eye and Ear Infirmary Reports of January, 1898, entitled "The Technique of the Mastoid Operation."

We have no apology to offer for this proceeding, so unusual in journalism. The interest which this subject, at the present time, is exciting among aural surgeons, and the fact that the paper is the best presentation of the subject in the English language, are sufficient, in our opinion, to warrant us in giving our readers the benefit to be derived from its perusal.

THE FUNCTIONAL RELATIONS OF THE TWO EYES—SIMULTANEOUS VISION, BINOCULAR VISION, AND ALTERNATE VISION.*

BY DR. H. PARINAUD, PARIS, FRANCE.

II. SIMULTANEOUS VISION.

IN the preceding article we defined the binocular visual apparatus as a complete organic apparatus, composed of a sensory part, represented by the special connections of

* Translated by W. S. Pearsall, M. D., from *Annales d'Oculistique*, November, 1897.

the retinae with the visual centers; of a motor part, represented by convergence, and of a union of the sensory with the motor part, brought about by the retinal reflex of convergence.

What we must establish now is that this binocular visual apparatus is developed upon another apparatus of vision connected with the eyes, the *apparatus of simultaneous vision*; and that these two apparatuses, while intimately united the one with the other, preserve at the same time their functional individuality. They also preserve their pathological individuality, which is the best proof that they have a distinct anatomical basis.

Strabismus of itself furnishes us with a demonstration of the existence and the independence of these two apparatuses. The strabismus called concomitant is, in fact, characterized by a vicious development of the binocular visual apparatus, relating to the apparatus of simultaneous vision, or affecting it only indirectly through secondary modifications brought on by the deviation. The vice of development acts, at the same time, upon the motor and the sensory part of the apparatus by changing the connections that unite the one with the other.

The ocular deviation, which constitutes the principal symptom of strabismus, has not its cause in a muscular trouble, as has been supposed, but in a difficulty of innervation of convergence. If Von Graefe and Giraud-Teulon have maintained that there is no difficulty with the innervation in strabismus, it is because they do not distinguish between movements associated with direction and movements associated with convergence. The innervation of movements associated with direction is really intact; it is the innervation of convergence alone that is changed.

The deviation of strabismus, a difficulty of innervation due to excessive or diminished convergence, consists of an *alteration in the motor part of the binocular visual apparatus*.

A study of the pathogenesis of this deviation leads us to the further conclusion that, if we except the case of cerebral affections in early infancy,—directly modifying the inner-

vation of convergence,—all the causes of strabismus are referred to convergence through the two habitual factors, the reflex of convergence and the accommodation. I believe that I have demonstrated this in my studies of strabismus, and it would be too lengthy to reproduce here. Moreover, I have cited examples in speaking of convergence in the preceding article.

Let us see now if these visual troubles of strabismus can be explained by a change in the sensory part of the binocular visual apparatus.

The dominant fact in the vision of those suffering from strabismus is the *absence of diplopia*,—a contrast with paralytic deviations of the eye, which are accompanied by diplopia. This fact is explained by abstraction or psychic neutralization (Von Graefe, Javal) or by regional exclusion of one of the images (Ulrich). Such explanations are without significance to the physiologist. Why, for instance, do not patients suffering from paralytic strabismus have recourse to psychic abstraction to disembarass themselves of a disagreeable diplopia?

The absence of diplopia is due to the change in the sensory part of the binocular visual apparatus, the fundamental property of which, as we have said, is precisely *the faculty of perceiving, and at the same time exteriorating, the binocular images of the same object*, which produces a diplopia when the images cannot be fused.

In order to account for this it is necessary to consider the vision of the strabismic patient not only during the deviation but also, and more particularly, after the straightening of the eyes. Ulrich has distinguished eight classes of facts relating to the diplopia of strabismics. These eight classes of facts represent so many degrees of alteration of the sensory apparatus of binocular vision.

Another peculiarity that has struck oculists is that diplopia, when it exists after the straightening of the eyes, affords little trouble, and the patient has little tendency to fusing the double images.

This fact is explained, according to the psychological

conception of vision, by saying that there is an absence of the necessity of fusion, an abhorrence of binocular vision, etc. To these explanations Javal has recently added another, "the repulsion of images."

The slight constraint that causes the diplopia and the lack of tendency to fuse the double images is due simply to the alteration of the retinal reflex of convergence, in consequence of changes in the sensory part of the binocular visual apparatus. A study of the clinical facts shows us all the degrees of change of retinal reflex at the same time that it shows us the possibility of its development by exercise when the change is not too profound and the patient not too old.

In some very interesting cases it is not simply the faulty development of the sensory apparatus, as we have shown, but an abnormal development of this apparatus. If we place a prism of vertical reflection before one eye and a colored glass before the other, some strabismics suffer from diplopia, but, curiously enough, the images appear one below the other; that is, in spite of the deviation, they appear as if the eyes were normal. If we straighten the deviated eye by an operation, the diplopia persists, but with false projection, as if the patient were suffering from a paralytic strabismus. More often, in cases of this class, the normal projection also remains, and with the deviated eye the patient projects sometimes in one way and sometimes in the other, that is to say, without changing the position of the eyes there is at one time homonymous diplopia and at another crossed diplopia. These facts attest the existence of new connections of the retina with the visual centers, tending to the development of a new system of identical points and to the establishment of binocular vision in spite of the vicious position of the eye. It has been said that there is then a development of a supplementary fovea. This is a bad interpretation of facts; everything takes place in the brain, and the part of the retina which has become the identical point in relation to the fovea of the good eye has no other attributes of the fovea.

Strabismus modifies, then, not only the faculty of perception and of exterioration at the time of the impressions of the same object upon the two retinæ, but also the method of projection of images producing binocular vision. In a word, it modifies the two properties that we have studied as characteristics of the sensory apparatus of binocular vision.

We see, on the other hand, that the deviation in strabismus has its cause in a difficulty of innervation of convergence, that is, in changes in the motor part of the same apparatus.

We know, finally, that the change in the retinal reflex of convergence, leading to a change in the connections that unite the sensory and motor parts of the apparatus, is a fundamental symptom of the affection.

Strabismus, then, offers us a remarkable example of the change of all the constituent parts of the apparatus of binocular vision, while at the same time the study of its pathogenesis, of its different clinical modalities, gives us an understanding of the function of this apparatus.

Let us now examine the rest of the visual apparatus when the apparatus of binocular vision is defective, or has not been developed on account of obstacles to binocular vision existing in infancy. Most of the old cases of strabismus realize these conditions, but binocular vision may be abolished without strabismus; this may be seen, for example, in the higher degrees of myopia creating physical conditions incompatible with binocular vision and hindering, in this way, the development of the nervous apparatus of binocular vision.

In spite of the abolition of the innervation of convergence, which is the limit toward which all cases of strabismus tend, all individuals deprived from infancy of binocular vision the associated movements of direction are preserved in the motor apparatus. The amplitude of these movements may be reduced, owing to the contraction of the periocular tissues consequent upon the vicious position of the eye, but their innervation is normal, and it is this that has

led authors falsely to exclude the nervous influence in the pathogenesis of strabismus. It is not only the innervation of these movements that is normal; there are also other factors in these movements—the voluntary impulse, the retinal reflex of direction—which are intact and assure the regular play of this function.

There is, then, a primary fact: the preservation of the associated movements of direction and their normal function, contrasted with the abolition of the associated movements of convergence or of distance.

How does the person deprived of binocular vision see? Being deprived of convergence, the images of the same object varying in distance do not strike at the same time upon the fovea of each eye. It is possible to see the object fixed, distinctly, with only one eye at a time. This is evident in strabismus, but it is equally true when binocular vision is lost without strabismus. Let us examine the most typical cases, those of alternating strabismus where the individual, enjoying good central acuteness, fixes the object indifferently with one eye or the other. The deviated eye, the eye which does not fix the object, is not excluded from vision on this account: it perceives all the objects contained in its visual field, and it exteriorates their images normally in spite of its vicious position. To make sure of this, it is sufficient to isolate the visual field of the deviated eye by means of a median screen and to examine it while the patient fixes an object with the other. In some cases of inveterate strabismus, the visual field of the deviated eye, examined in this way, presents secondary changes, but in the greater number of cases the field is normal: the patient perceives objects contained in this visual field at the same time as those that are contained in the field of the fixing eye. Furthermore, by requesting him to place the finger quickly on the object, we are assured that the deviated eye exteriorates its image normally, that is, where it really is, and also exactly the same as the fixing eye. We must also add that the objects that impress this eye to the exclusion of the other, determine, by their reflex

action, the associated movements of direction as exactly as do those that impress the retina of the fixing eye.

Here, then, is a second fact: the individual deprived of binocular vision enjoys meanwhile a certain amount of vision with the two eyes. The deviated eye is excluded from central fixation, but it is not excluded from general vision. This is what I call *simultaneous vision*.

Binocular vision having been always identified with the vision of the two eyes in the common visual field, it is difficult for our minds to comprehend vision with the two eyes that is not binocular vision, especially with the old ideas of nervous conduction, based upon the continuity of the fibers uniting the retinæ to the visual centers. It is on this account that in my demonstration I have proceeded by elimination, showing that while binocular vision is destroyed, there still remains a method of vision with the two eyes.

Let us look for a little more precise idea of this method of vision. An example is better than a description. Hold the hands on each side of the head so that the right hand may be seen only by the right eye and the left hand only by the left eye, as may be made certain by closing first one and then the other eye. While both eyes are open you see both hands at the same time. It might seem sure that this was due to alternate vision already spoken of—to successive vision with each eye, rather than simultaneous vision of both hands. In moving them inversely, you have a very clear simultaneous vision of two different movements. This mode of vision, which is quite distinct from alternate vision, is equally different from binocular vision; of which there can be no question, since the vision of eyes is exercised in independent parts of the visual field. Extend this mode of vision in your mind to the common part of the visual field, and you will have an idea of simultaneous vision.

To understand why the binocular images of an object situated in the common visual field cannot be exteriorated in a condition of diplopia, it is sufficient to say that the connections that preside over this mode of vision do not

allow of the centralization of the two images in a single cerebral point. In order to fix these ideas let us suppose that in this mode of vision each retina shall be in crossed relation with the opposite hemisphere,—which, in spite of the semi-decussation in the chiasma, is perhaps the truth,—so that both retinæ are impressed with the same object, each, however, exercising its own proper function. There will be simultaneous vision of the object, but no fusion of the two retinal images of the object into a single one. This method of exercising the function of the eyes may be compared to that of the two ears impressed by the same sound.

If we separate the mind from the ideas received, simultaneous vision is easy to understand. But a difficulty presents if we consider the central vision. From this point of view let us examine a case of alternating strabismus that we have taken as an example of simultaneous vision. We have said that the eye not being fixed is not on this account excluded from vision, that it perceives the objects contained in its own visual field, and projects the images of these objects normally, in spite of its vicious position. Let us examine this person with the stereoscope; if we do not induce binocular vision we nevertheless establish the characteristics of simultaneous vision, that is, if, while he fixes an object placed in one compartment of the stereoscope, we place a different object in the compartment of the deviated eye, this object is seen as in the examination at the circumference. Let us now induce binocular vision by placing in each compartment of the stereoscope two images of the same object. It may happen that he sees the two objects as before, but more often one of the objects disappears and an alternation between the two eyes is established. In ordinary vision this person, unable to fix an object with both eyes at the same time, and not suffering from diplopia, it is quite evident that alternation is established for central fixation. In reality, then, what we call *simultaneous vision* is a combination of simultaneous vision for the visual fields and of central alternating vision. We

shall understand better how this combination is established when we study alternate vision. We will refrain here from a description of it.

Let us now define the apparatus of simultaneous vision :

Like the binocular visual apparatus, it is composed of a sensory part, a motor part, and the connections that unite the one with the other.

The sensory part is made up of the special connections of the retinae with the visual centers, characterized by the following properties :

The simultaneous perception of objects that impress both retinae without cerebral fusion of the two images of the same object, whence the absence of diplopia.

The normal projection of retinal impressions independent of the relative position of the eyes, consequently a different projection from that of the binocular visual apparatus.

Alternating central vision.

The motor part is represented by the *associated movements of direction*.

The bonds that unite the sensory and motor parts are represented by the *retinal reflex of direction*. This reflex seems to be distributed equally over the whole extent of the retina and acts as well by excitation of a single retina as by excitation of the two. It differs thus in two ways from the reflex of convergence limited to the central parts of the retina and requiring for its production the excitation of both retinae.

Before leaving the subject of simultaneous vision, let us show, by an example, how this mode of vision may, in normal eyes, be substituted, under certain conditions, for binocular vision.

Aim a pistol with both eyes open. You believe that you see with both eyes ; but it is not so—you see with one only. To prove this close each eye alternately ; you notice that the sight on the pistol and the object aimed at are on the prolongation of the same line for one eye only, generally the right. If you close the left eye the pistol still points toward the object ; if, on the contrary, you close the right

eye the sight on the pistol is strongly displaced toward the right, and the pistol is no longer pointed toward the object.

Only one eye is fixed upon the object. Nevertheless, it is easy to prove that the eye that is not fixed sees all the objects contained in its visual field. This is the mode of vision that we have defined, characterized by simultaneous vision of the visual fields and alternating central vision.

Later on we will give the physiological explanation of the substitution of simultaneous vision for binocular vision in normal eyes.

III. ALTERNATING VISION.

We habitually look with both eyes, and both retinæ act at the same time upon the brain, producing binocular vision or simultaneous vision. Nevertheless, it is a fact that we may see with one eye alone. What are the nervous connections that preside over monocular or alternate vision?

In spite of the anatomical arrangement which places the two halves of each retina *en rapport* with the corresponding cerebral hemisphere and, consequently, each retina *en rapport* with both hemispheres, when we close one eye it is probable that the retina excited acts only on one hemisphere, which ought to be that of the opposite side according to the general law which presides over the innervation of the lateral sensitive and motor organs. Many facts demonstrate that this is really so.

Let us recall the experimental and clinical facts which, with Charcot, we have already admitted: that each retina, in some way, can put itself wholly *en rapport* with the opposite hemisphere.

Munck and other experimenters have demonstrated that, after the ablation of the cortical zone of one side, there is an amblyopia or crossed amaurosis, which disappears after a certain time.

Tissot and Contejean have recently demonstrated the same fact (*Société de biologie*, 30 juin, 1897), and admit that the fibers not being crossed in the chiasm are crossed elsewhere.

The transitory amblyopia called ophthalmic migraine, which is surely of cortical origin, and manifests itself in the same individual, sometimes in the form of hemiopia and sometimes as crossed amblyopia, pleads in favor of a double connection between the retinae and the hemispheres.

Charcot has presented his scheme to explain the facts of amblyopia or unilateral amaurosis connected with hemianæsthesia of the same side. Since, in hysteria, this unilateral amblyopia is seen to be removed, in the phenomena of transfer, at the same time as the other symptoms of hemianæsthesia, it only sustains the idea that this amblyopia, like the hemianæsthesia itself, may be the result of a crossed connection of the retina with the hemisphere.

Let us see if the physiological facts accord with this view :

"When, after closing one eye," says Helmholtz, "we look at a printed page, we see the characters and the white paper without noting the obscuring of the visual field of the closed eye. . .

"It is the same when, having opened the eye that was closed, we hold a sheet of white paper quite near to it in such a way that its visual field, which was formerly obscured, is now uniformly lighted in white. In this case, also, we see the characters contained in the other field without modification" (*Optique physiologique, édition française*, p. 965).

Again, I borrow from Helmholtz the following experiment: "I look at the sky while holding before one eye a red and before the other a blue glass; I incline the two glasses to the visual lines so as to see in each of them faint traces of images of objects situated at the side. Then I displace sometimes one, sometimes the other, a little, so as to displace the images that they reflect. "If we direct our attention to these changing images, which should, moreover, be very obscure and dim, we immediately see upon the sky the color of the corresponding glass. It is a strange spectacle to see the blue sky become suddenly all red or the red sky all blue as if by command" (p. 976).

Helmholtz describes an instrumental arrangement to facilitate this experiment which has been used by several authors. We may make use of a stereoscope or proceed without an instrument in the following manner: "If we look at a printed page with both eyes open, and place a red glass before one eye, we see the red color mixed with the white in each visual field; but if we use two or three more red glasses, so that the letters are effaced, the red tint of the visual field disappears at the same time while in monocular vision the red tint remains intense."

These experiments show *that alternate vision may be established for the whole visual field, not only when each eye is closed alternately but also when both eyes are open.*

The experiments relative to the antagonism of the visual fields, which is really only the antagonism of the different methods of vision that I described, show also that alternation may be established for certain parts of the visual field only. Concerning this question, I refer to numerous experiments upon the antagonism of the visual fields related in Helmholtz' work.

There is a variety of alternate vision that interests us particularly; that is, central vision with preservation of simultaneous vision of the visual fields. It is this variety that we have studied in strabismus and, in general, in all the cases of loss of binocular vision; it is this variety that we have also seen produced with the normal eyes under certain conditions.

This combination of simultaneous vision of the visual fields with alternate central vision evidently assumes that the fibers which serve as conductors for the macular elements of the retina have their own proper connections with the visual centers independent of those of the visual field. This independence has, in fact, been admitted and sustained by a large number of facts, anatomical, clinical, and experimental. From our point of view, I do not know of any more significant than the following:

A person is attacked with a monocular hysterical amaurosis. If the well eye is covered the other eye per-

ceives nothing, not even the light of the lamp. However, by making the patient look through a stereoscope we may be convinced that this eye sees when both are open. The free-thinkers hasten to say that the person pretends; this is not so, for I have made control experiments that eliminate simulation. In studying these facts I have also noticed that the re-establishment of vision affects only the central vision. The visual field of this eye remains contracted as much as 5° or 6° , in vision with both eyes.*

From these and other observations I have come to the conclusion that there are different connections for peripheral and central vision, and that in central vision the connections are still different for monocular and binocular vision.

Let us recall this fact, that the nervous connections which constitute the sensory apparatus of binocular vision, forming the anatomical basis of identical points, have their maximum development in the central part of the retina and do not seem to extend very far from the center, according to the experiments of Volkmann, Mandelstamm, and Schoeler.

As I have said, we may look upon the central fibers as forming the axis around which these connections develop. But in order that these connections shall be active, in order that the binocular visual apparatus shall come in play, in order that the retinal reflex of convergence shall be produced, it is necessary, as an initial condition, that the central fibers shall be excited at the same time and centralize their action in a certain point in the same center, which, as by an electric contact, calls up all the impulses necessary to the function of binocular vision. If this excitation is not produced, be it that the binocular visual apparatus has become deteriorated or that it is called upon under conditions such as to prevent its normal action, then alternation of central

* These facts, which, when first noted (*Thèse d'agrégation de Grenier sur les localisations cérébrales*, 1886.—*Amblyopies hystéro-traumatiques; considérations sur la vision binoculaire*): Ophthalmological Society of Paris, June, 1889), were received with a certain amount of incredulity, have since been confirmed by Pitres, Ballet, and Antonelli.

vision is established and the apparatus remains at rest. In this way we can understand the possibility of the combination of alternate central vision with simultaneous vision of the visual fields and how we may also explain the temporary suppression of binocular vision in the normal eyes when the nervous excitation necessary to produce the action of this apparatus is rendered impossible.

IV. THE PHYSIOLOGICAL RÔLE OF SIMULTANEOUS VISION, OF BINOCULAR VISION, AND OF ALTERNATE VISION. THE EXPLANATION OF CERTAIN PECULIARITIES OF VISION BY THE THREE FUNCTIONAL MODALITIES.

Recognizing the three functional modalities of the visual apparatus, let us endeavor, in a general view, to find out the reason for their existence and their respective rôles.

It seems, in the first place, that all the objects contained in our visual field are seen with the same clearness, but we know that this only appears so. It is on account of the remarkable mobility of our eyes that we have the illusion of equally clear vision with different parts of the retina. In reality, distinct vision is limited to a certain very restricted part of this membrane, the central fovea, which is only three- or four-tenths of a millimeter in extent. This may be shown by immobilizing the gaze of one eye upon a single letter in the middle of a word; this letter only is seen very distinctly, the neighboring letters being a little confused. The first condition, then, of distinct vision of an object is the formation of its image upon the fovea, and this result is obtained on account of the mobility of the eyes which, like a glass whose field is very restricted, are turned with marvelous rapidity upon the object.

What are the influences that determine this movement? It is sometimes voluntary, but the volition is usually induced by an impression of the object in the peripheral field. All conscious action is habitually repressed, and it becomes a reflex, on account of which the impression on the periphery of the retina determines the direction of the eyes toward the object which has produced this impression.

This calls into play the retinal reflex of direction and the apparatus of simultaneous vision.

In order to accomplish this we must understand that the nervous connections that characterize the sensory part of the apparatus of simultaneous vision are extended over the whole retina. Simultaneous vision is more particularly a function of peripheral vision; the reflex of direction, which is proper to it, is determined by the impression of objects situated more or less peripherally in the visual field. Although the reflex acts upon both eyes on account of the association of muscular movements, the excitation of one retina is sufficient to produce it.

The image of the object is thus obliged to be formed upon the fovea, in at least one eye, and the object will be seen distinctly. If the individual is deprived of binocular vision, he is restricted to this method. Being deprived of binocular vision he is deprived of convergence, consequently the image of the object will not be formed upon the fovea of both eyes, or, if so, only exceptionally. Consequently, he will not have central, that is to say, distinct, vision with both eyes at the same time. He will be contented with alternating central vision and will not be otherwise inconvenienced. It is in this way that those animals see, which, having a common visual field, have simultaneous vision without binocular vision, because they have no convergence.

But if the person possesses binocular vision, normal vision with both eyes permits a second operation. The retinal images compelled to strike upon the fovea, or in its vicinity, determine a new reflex—the *retinal reflex of convergence and the action of the binocular visual apparatus.*

Thus we can understand the localization of retinal reflex of convergence in the central parts of both retinæ. It differs from the reflex of direction, because it implies the simultaneous excitation of both retinæ, the excitation of one retina alone being sufficient to determine the movement of direction in both eyes.

From the point of view of function, as well as of evolu-

tion, binocular vision would appear to be a function the result of a more perfect development destined to give greater precision to that sensation, especially as regards its localization in space. Admirable as this function is, it is not indispensable, since many persons are deprived of it without being seriously inconvenienced and without suspecting it.

To understand the reason for the existence of these different modes of vision,—simultaneous, binocular, and alternating vision,—we must consider the visual perceptions alone; we must also consider that the retinal excitations determine a multitude of unconscious reactions in the brain, on account of which the eye acts, not as an isolated organ, but as one whose action is associated with the other senses, to produce reflex acts in the head, the limbs, and the entire body. In this way we may conceive of a special reason for the existence of crossed connections presiding over alternating vision.

Let us now look for the physiological explanation of certain visual phenomena that are produced under special conditions, when something more or less abnormal is demanded of the visual apparatus, as in certain experiments that we shall cite, for example, those that give rise to what is called the antagonism of the visual fields.

To explain these facts we must admit the following that I have already had to enunciate, and which I believe to be indisputable:

Organic apparatus, like mechanical apparatus, is necessary in order that an impulse may become active. This impulse may come from the will, but more frequently exists in a peripheral excitation. When an apparatus is differentiated for several functional modalities, like the visual apparatus, it reacts differently according to the different modes of excitation. This relation between the functional modality and the mode of excitation is the more intimate, since, according to the doctrine of evolution, it is the persistent influence of a mode of excitation in a series of beings which determines the functional modality.

From this point of view, let us examine what occurs in

the experiments I have cited, where, aiming a pistol with both eyes, there is a substitution of simultaneous vision for binocular vision. In this case binocular vision is suppressed because we demand it in conditions where it cannot be exercised. If, in fact, we fix the sight of the weapon, the object looked at will be seen double, in virtue of the property of identical and non-identical points.

It is seen that we can explain the result of this physiological experiment without the necessity of invoking, as has been done in the same method of vision in strabismus, the theories of psychic neutralization, regional exclusion, etc., etc., words which explain nothing.

The conditions where alternating vision totally replaces associated vision, both eyes being open, is explained in the same way. We have seen that if we place a red glass before one eye and a blue glass before the other, and then gaze upon a uniform surface like the sky in which there are no clouds, it is sufficient to impress one retina with even a very feeble image of an object in order to produce alternating vision, by suppression of the diffuse luminous excitation of the other retina.

Upon this physiological theory of vision is explained the fact of attracting the attention or even the influence of outlines. I do not contest the existence of a certain rôle played by voluntary impulses in the activity of our visual apparatus, but more frequently this impulse is exercised in an indirect manner, as we have seen in convergence where it is provoked by a peripheral impulse.

In the present case it seems to me that it is the retinal image that attracts the attention, and the voluntary or subjective impulse is still less necessary for the production of alternating vision, when, as in the case cited, we analyzed what followed the use of colored glasses; there are others where this adaptation is produced without our being conscious of it.

As to the influence of outlines, which, says Helmholtz, "rests essentially upon a psychic habit," we have again one of those expressions that can give no satisfaction to the physiologist.

I explain the influence of outlines, and especially the experiments in question, by saying according to the principle announced above: our visual apparatus is developed less for diffuse luminous sensations than for the perception of objects. Its natural and habitual excitants are the retinal images of objects. When one retina receives only a diffuse luminous excitation, and the other the excitation of a retinal image, the brain acts as if only one eye were impressed: the visual apparatus adapts itself for alternate vision as if one eye were closed.

If we take the trouble to analyze all the experiments relative to the antagonism of the visual fields discussed at length in Helmholtz' treatise, we will see that they are explained physiologically on this same principle. We will see that the condition necessary for the production of this antagonism is the demand for binocular vision in conditions where it cannot be nominally exercised, and that *the antagonism of the visual fields is nothing more than the antagonism between different modes of vision, as I have already stated.*

Contrary to the opinion of Panum, Hering, and Helmholtz, these facts of antagonism, like all the other visual phenomena, may be explained by the organic arrangement; that is to say, they are susceptible of an exclusively physiological interpretation.

UNILATERAL ALBUMINURIC RETINITIS— WITH A CASE.

BY SAYER HASBROUCK, M. D., PROVIDENCE, R. I.

THE literature of ophthalmology shows that only a few cases of unilateral albuminuric retinitis have been reported, and it is safe to say that but few of the present ophthalmologists have seen a case.

Unilateral retinitis from other causes is more frequent, but even this form is rare where it is not followed by involvement of the fellow eye, if the patient lives long enough. It is admitted that the freaks of nature are oftentimes beyond our comprehension, and the wisest minds find difficulty in explaining the reasons why; but, as I have no theories to offer in the present case, I will confine myself to the history of the case and the theories of others.

It has been my lot to see one case, remarkable in many ways, of unilateral albuminuric retinitis, a report of which I feel sure will be of interest to all. It is unique in more ways than one: first, because of the typical character of the inflammation when first seen by me, which prompted me to call the attention of his family physician to the possibility of albuminuria being its cause; second, on account of the long duration of time during which the patient has had albumin in his urine,—now some three years, and probably four, as will be later shown,—without involvement of retinal trouble in the fellow eye. (The only thing lacking to make the case entirely unique is a *post-mortem*, and at times even this has seemed imminent;) third, the fact that the retina has been involved at least twice in active inflammation and both times recovered, though each time leaving the evidence of its disastrous work behind it.

Nettleship, in his fifth edition (1890), says, "A second attack of retinitis sometimes occurs in connection with a relapse of renal symptoms."

From the patient's physician, Dr. Geo. D. Hersey, I learned that on the evening of January 14, 1894, while waiting in his office, reading, he became suddenly blind in the left eye, and at his suggestion the patient consulted Dr. F. B. Sprague, an oculist, who found a retinal hemorrhage near the macula and an engorged condition of the retina between that and the disc. He attributed the trouble at that time to albuminuria, and ordered rest and Basham's mixture. On the following day he found the vision of right eye with $+ 2.75$ D. spherical = 1.0. The left vision = 0.

There were no especial changes noticed while he was under observation, and on March 14, 1895, he was ordered $+ 5.75$ D. spherical for near vision. Dr. Sprague last saw the patient July 15, 1895, and his records show that the hemorrhage had been absorbed and there was only a small atrophic spot left in the retina, and at that time he is sure there was some vision in the left eye, but how much he cannot say, except that his records show that he ordered O. D. $+ 6.25$, O. S. $+ 5.75$, and the patient was allowed to resume his work as a machinist.

From that time until September 19, 1895, he continued at his work. On that date he consulted me on account of a small hemorrhage in the conjunctiva of the right eye; and as, he said, he had lost the vision of the left eye on account of a hemorrhage in the retina, he wanted to do all he could to keep the vision of the right. On examination of his eyes I found vision of right with $+ 3.0$ D. spherical = 1.0; left, good perception of light. The ophthalmoscope showed a small pinhead hemorrhage in the outer field of the retina, but otherwise it was normal, and has remained so up to March 19, 1898, when last seen by me. The left eye ground showed an atrophic disc with a subsiding stellated opacity of the retina typical of albuminuria. There was also a partial obliteration of one of the retinal arteries just below the macula. Suspecting albuminuria, I referred him to Dr. Hersey, his family physician, with the request that he make an examination of the urine.

At my suggestion Dr. Hersey has given me the following notes of the case: "Mr. C. returned to me in September, 1895, saying that you had suggested urinary examination, etc. The urine at that time contained nearly one-eighth of one per cent. of al-

bumin. Sp. Gr., 1.008. Microscopical examination showed a few hyaline casts with an occasional granular cast. From that time to the present the urine has been examined, at intervals of six to ten weeks, and invariably contains albumin, though in varying quantities—sometimes a mere trace. Microscopical examination has not shown increasing trouble, as the casts found at one time may be wholly absent at another. I commenced treatment with attention to the bowels and condition of the skin and gave infusions of digitalis. This had been alternated with Basham's mixture with occasional intermissions when the stomach needed a rest. The specific gravity of the urine, which was 1.008 in September, 1895, gradually increased, and for the past year has ranged from 1.012 to 1.018."

By this statement it is shown that albumin was found in the urine in September, 1895, and has remained constant since then in varying quantities; and though there is no positive evidence that there was albumin in the urine in January, 1894, still Dr. Sprague is quite sure that he had a specimen examined at that time and that albumin was found. He also agrees with me that the most probable cause of the sudden loss of sight at that time was due to albuminuria.

It is also evident that the retinal trouble was absent in July, 1895, and at the same time it had been active between that time and September, 1895, showing at least two active inflammations of the retina. Whether there have been other periods of activity I cannot say, as he has only occasionally visited me; and during the eighteen months he was under Dr. Sprague's care he only saw him six or seven times.

On October 1, 1895, I ordered O. D. + 3.0 D. spherical with 1.0 vision, and O. S. + 3.0 D. spherical with vision of large objects. January 7, 1897, his vision with + 3.0 D. spherical was 1.0 in the right, and good perception of light in the left. The ophthalmoscope showed no trouble with right, and an atrophic disc in left with contracted vessels. On August 2, 1897, he came to me complaining of his distant vision, and as he thought a + 3.25 D. spherical gave him better vision (1.0??) I ordered that glass.

On March 19, 1898, he came to me again, and I gave him his old lens of + 3.0 D. spherical with vision 1.0?? and + 6.0 D. spherical for near vision. At this time the vision of the left eye was *nil*, and the ophthalmoscope showed practically the same

conditions as last stated. During this time he has had a number of attacks of indisposition, attributed to digestive disorders, that have worried his family a good deal. At these times he is dizzy, etc., and compelled to keep to the house for a time; and, although he has not taken the best of care of himself, still he has been able to do his work fairly well for one of his age—sixty-two years.

Fortunately I have a record of his case previous to the loss of vision in January, 1894, as I examined him in July, 1893, for a pension. This record shows that he then had a chronic catarrhal conjunctivitis with a hyperopia. Right vision with $+ 2.50$ D. spherical = 1.0; left, with $+ 2.50$ D. spherical = 1.0. With $+ 5.50$ D. spherical, right and left, read Jaeger II. At that time the ophthalmoscope showed both eyes to be normal.

Having thus gone into the history of this case, it will be of interest to review briefly the literature of the subject. Dr. G. E. de Schweinitz, who reported two cases of this condition to the section of ophthalmology in the College of Physicians of Philadelphia, November 17, 1896, which report was later published in the *Medical News*, December 19, 1896, says: "In regard to the frequency with which unilateral cases occur opinions differ. Thus, Gower says, 'Both eyes are almost invariably affected'; Allbutt says, 'The retinal mischief always attacks both eyes'; while Knies declares, 'Unilateral retinitis albuminurica is not extremely uncommon.'"

There have been a number of cases reported, but the most interesting case is that of Yvert in the *Recueil d'Ophthalmologie* for March, 1883. This case, a male forty-eight years of age, was suffering with albuminuria, and was affected with a retinitis in the left eye. After being under observation seventy-two days he died. At the autopsy the right kidney was found to be entirely absent, there being no trace of ureter, artery, or vein. The left kidney showed well-marked parenchymatous nephritis. Yvert also explains one-sided retinitis albuminurica in his case by assuming an irritation of the sympathetic nerve of one side due to a unilateral affection of the kidney.

Brunet (J. A. M. A., vol. ii., 1885, p. 150) describes a case of right-sided anasarca with right-sided retinitis albuminurica.

Henry Eales (Trans. Oph. Soc. U. K., vol. v. p. 126) reports a case of supposed unilateral albuminuric retinitis, the visual disturbance appearing one day after an injury to the left loin. Three weeks later the right eye was normal and there was a neuritis of left with exudates in the macula. The case resulted in atrophy of the disk and degeneration of the choroid. Albumin gradually disappeared and casts were not found.

Bull analyzes 103 cases (Trans. Am. Ophth. Soc., 1886, p. 185). Both eyes were affected in fifty cases at the time of examination, and both eyes became affected in ninety-three cases. The natural inference is that there were ten cases of unilateral trouble. This, he assures Dr. de Schweinitz, was the case, and he further stated that he had at that time one case of unilateral albuminuric retinitis under observation.

Dr. Linnell, in his work on "The Eye as an Aid in General Diagnosis," states: "Usually both eyes are affected, but often in varying degrees."

Marple, in the *New York Medical Record* for March 11, 1893, remarks: "According to the testimony of most observers, unilateral neuro-retinitis of Bright's disease, even where it remains unilateral for only a short time, is of rare occurrence. Cases which remain for months or years with only one eye involved are excessively rare. When the affection comes on in a few hours, as after an injury, or remains limited to one eye for months or years, as in chronic renal disease, the ordinarily accepted theories as to its causation seem inadequate. A satisfactory explanation of such cases seems difficult, if not impossible."

De Wecker ("Ocular Therapeutics," translated by Forbes) says: "There are certain forms in retinitis in Bright's disease which appear merely as simple hemorrhagic retinitis, but in the vast majority of cases true nephritic retinitis is characterized by the appearance of patches of

fatty degeneration either connected or not with old-standing clots. Moreover, while in simple apoplectiform retinitis cases were not infrequent in which the affection was limited to one eye, or did not attack the second until late, nephritic retinitis generally commences simultaneously, or within a short interval, in both eyes."

These cases are sufficient to illustrate the fact that unilateral albuminuric retinitis exists and is believed in by others. What the cause may be is not so clear. Yvert's theory of irritation of the sympathetic nerve is accepted by many, and still it does not seem to cover all cases. Just what the cause in my own case was I do not feel able to say. Possibly in the first instance it may have been apoplectic, but at the time I first saw him it was surely a typical case of albuminuric retinitis, and the other eye remained free for over two years afterward. At the same time, I feel sure that albuminuria was the cause in both instances. As Dr. de Schweinitz says, it would be "an interesting clinical observation in these unilateral cases if catheterization of the ureters and separate analysis of the urine from each kidney were made." It is to be hoped that some observer may be able to do this in the future.

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THE TECHNIQUE OF THE MASTOID OPERATION.*

BY EDWARD B. DENCH, M. D.

SO many monographs have appeared recently on operative procedures upon the mastoid process that the author feels that an apology is necessary for writing in detail upon this subject. I had supposed that in my recent work on "Diseases of the Ear" this topic had been treated sufficiently at length. A short time ago, however, an otologist of some repute was asked by a student where he could find a complete description of the technique of the mastoid operation. The reply was, that "the procedure was not described in any English work excepting that of Dr. Dench," and that even in this book the account was exceedingly meager. It is to correct this fault, therefore, that I take the liberty of writing upon this subject.

Preparation of the Field of Operation.—No operation should be performed upon the mastoid process excepting under full aseptic precautions. The field of operation should be sterilized in the most careful manner. My own practice is to have the head shaved over an area of three inches from the center of the meatus. The parts are then thoroughly scrubbed with soap and water, then washed with ether, and then with a solution of bichloride of mercury, 1-1000. Previous to the shaving, the ear is syringed with a solution of bichloride of mercury, 1-3000, and the canal is tamponed with a strip of iodoform gauze.

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After the entire field of operation has been cleansed, it is covered with a moist bichloride dressing, which is not removed until general anæsthesia is complete. All instruments used in the operation are sterilized by boiling. After anæsthesia is complete, the protective dressing is removed and the head is covered with a towel, moistened in a solution of bichloride of mercury, 1-1000, the field of operation alone being exposed. The surrounding region is protected in a similar manner.

The primary incision should be made from below upward, and should extend from just below the tip of the mastoid process to a point just above the attachment of the auricle. The incision should follow the line of auricular attachment, and should lie about an eighth of an inch behind this. If the incision is made farther backward, the anterior flap becomes greatly swollen, and a perfect exposure of the field of operation is difficult. This thickening of the anterior flap not infrequently leads to considerable displacement of the auricle, which may persist for many months. If the incision is made close to the line of auricular attachment, no deformity follows the operation. The primary incision should be carried through the periosteum, the soft parts being divided by a clean even sweep of the knife. There is seldom sufficient hemorrhage to require the attention at this time. If any large vessels are divided, however, they may be secured by means of pressure forceps. The periosteum elevator is next used, and the anterior flap, including the auricle, is forced forward so as to expose the upper and posterior margin of the bony meatus. After this has been done, it is extremely easy to secure any bleeding points by means of the pressure forceps. The posterior flap may also be displaced in the opposite direction, although this is frequently unnecessary, the displacement of the anterior flap being sufficient. It should be remembered that, in every case requiring operative interference, the first step is to enter the mastoid antrum. Even in those cases where there is neither tumefaction nor tenderness over the mastoid, and where there is distinct evidence of rupture

of the abscess into the digastric fossa, the mastoid antrum should be entered, as the first step of the operation. I am well aware that in this advice I differ from such an eminent authority as Politzer, who states that it is sufficient, in certain acute cases, to enter the superficial cells only. No harm can result from entering the mastoid antrum, and not infrequently we find this pneumatic space involved, although there is no external evidence of this condition.

Certain "landmarks" enable the surgeon to enter the antrum easily. These are the upper and posterior margins of the bony meatus. If the bone is entered above the horizontal plane of the superior wall of the meatus, there is danger of exposing the meninges in the middle cranial fossa. The distance of the lateral sinus from the posterior wall of the bony meatus varies greatly. In the majority of cases it lies half an inch behind the posterior margin of the bony canal. Often, however, it is found nearer the bony meatus, and it is therefore advisable to perforate the cortex as close to the posterior margin of the bony canal as possible. The antrum or the aditus ad antrum lies within a triangle, the base of which is formed by the upper and posterior margin of the bony canal, and whose sides are formed by two lines, one drawn tangent to the superior margin of the bony meatus, and the other drawn tangent to the posterior border. This small triangle may be called the region of safety for entering the bone. As the mastoid process varies considerably in contour and in thickness in different subjects, it is often necessary to extend the field of operation backward for a considerable distance. It should always be remembered, however, that the deepest portion of the opening in the bone should lie within the triangle above described.

At the present day no surgeon would consider a mastoid operation complete unless the entire mastoid process had been thoroughly explored. In other words, it is not sufficient to enter the antrum, and to establish free communication with the middle ear, but all pneumatic spaces must be explored, from the mastoid antrum to the very tip of the

process. Dr. Gruening, of this city, was, I think, the first to urge the necessity of this radical procedure, and to him, more than to any one surgeon, we are indebted for formulating the operative technique in these cases.

After the bone has been exposed in the manner described above, and the landmarks clearly made out, the next step is to completely expose the tip of the mastoid process. It is impossible to separate the sterno-mastoid muscle from the underlying bony parts by means of the periosteum elevator, and the apex of the mastoid can only be exposed by cutting the tendinous attachment as close to the bone as possible. The blunt scissors, curved on the flat, are best adapted for this purpose. They should be applied closely to the surface of the bone, and while in this position should be made to divide dense fibrous tissue at the tip of the mastoid, by a series of short cuts, until the finger can be passed completely beneath it and into the digastric fossa. Unless care is taken to keep the instrument closely applied to the bone, there is danger of injuring some of the large vessels in the neck.

After the entire surface of the mastoid is exposed, the next step is to gain access to the antrum. When perforation of the cortex has occurred spontaneously, the opening may be enlarged by means of a sharp curette, the instrument being made to remove all softened bone, until the antrum is reached. In many cases, however, we find the mastoid cortex intact, and access to the antrum must be gained at the region of election above described.

The old hand-drill has been almost entirely discarded by the modern surgeon, and the chisel and gouge are most frequently employed to remove the mastoid cortex. The dental burr is an instrument which has of late come into use, and is exceedingly efficient in some cases. Personally, I prefer to remove the superficial portion of the mastoid by means of the chisel or gouge, and to break down the deeper parts with the dental burr. In using the chisel, the instrument should be applied nearly in the horizontal plane, the bone being removed in successive layers, and should be

directed downward and forward toward the bony meatus. At first it is wise to use an instrument of considerable size, removing large chips of the bone. As the wound becomes deeper, a smaller gouge should be used, it being always borne in mind that the deepest portion of the opening should lie in the triangle before mentioned. In this way a small, funnel-shaped excavation is made, the apex lying just above and behind the posterior wall of the canal. The antrum usually lies about half an inch beneath the mastoid cortex. This is by no means an invariable rule, the depth being quite frequently greater than this. As long as the opening in the bone is made close to the posterior wall of the meatus, and below the plane of the superior wall, the operator is perfectly safe. Where the antrum is very small, it may lie fully an inch beneath the mastoid cortex. If the operator is in any doubt as to the advisability of entering the bone to a greater depth, it should be remembered that the antrum can always be found by separating the soft parts from the posterior and superior aspect of the bony meatus. The upper and posterior wall of the bony canal may then be removed by means of the chisel, and the partition between the opening already made in the mastoid and the osseous canal may then be broken down. In this way, the tympanic vault is opened and the aditus ad antrum exposed. This can then be followed to the antrum itself, and every possible danger of injuring important structures may be avoided. When the antrum is not entered easily, this procedure should always be adopted, as it offers a perfectly easy and certain means of access to the mastoid antrum. When this pneumatic space has been entered through the cortex, in the ordinary way, the operator assures himself of the fact by passing a probe directly through the opening in the bone, downward, forward, and inward into the middle ear.

After the antrum has been opened, the probe should be used to explore carefully the upper and posterior walls of the cavity. In cases of advanced suppuration, we frequently find that the upper or posterior wall of the space

has been eroded by the destructive process, and it is important for the operator to recognize this fact early in operation. If the probe, passed carefully into the cavity, meets with a firm, bony resistance on all sides, the next step of the operation is to enlarge the superficial opening—that is, to break down the mastoid cortex in every direction, so as to expose completely all the pneumatic spaces. This is done by means of the chisel or gouge, until there is sufficient space to admit the rongeur forceps; this can then be used to remove the remaining cortex. For opening the deeper cells, either a small gouge or the dental burr is exceedingly efficient. All softened bone should then be removed by means of the sharp spoon. Particular attention should be given to the aditus ad antrum. This passage should be thoroughly curetted, and all granulation tissue and softened bone removed, so that any fluid in the tympanic cavity will drain through the posterior opening rather than into the external auditory meatus. Special attention should be paid to the tip of the mastoid process. In the majority of cases, we find a large pneumatic space at the very tip of the mastoid. It is therefore advisable to remove the tip of the process with the rongeur forceps, although this portion of the bone may appear perfectly healthy. It has often been my experience, in cases where the overlying bones had appeared normal, to find this large pneumatic space completely filled with soft, pulpy granulation tissue. If this is not removed, convalescence will certainly be prolonged, and in many cases a second operation will be necessary.

After all the pneumatic spaces have been explored, and all carious bone removed, such vessels as require attention should be secured with catgut ligatures. The cavity in the bone should then be packed with iodoform gauze, care being taken to carry the packing well into the aditus ad antrum, so that secretions from the middle ear will drain posteriorly. The gauze packing in the canal should then be removed, and replaced by a strip of fresh gauze. It is important that this packing be carried to the fundus of the

canal. If this is not done, granulation tissue may form either about the margin of the perforation in the membrana tympani or in the middle of the ear, owing to the retention of secretion in the meatus. It is important to remember that the cavity in the bone is the only portion of the wound to be firmly packed, the soft parts being allowed to resume their normal position. In this way, the superficial wound closes very quickly, leaving a sinus leading into the mastoid process. If the superficial wound is packed, convalescence is prolonged, and the ear does not resume its normal position for a considerable period after the operation. This rule does not apply to very young children. In these subjects the entire wound should be packed with gauze, in order to facilitate the subsequent dressings.

The wound and the ear are then covered, first with iodoform gauze, then with several layers of bichloride gauze, and subsequently with sterilized cotton, after which a bandage is applied. The first dressing is allowed to remain in position for from five to seven days, unless there is pain or an elevation of temperature. It has been my experience that these cases do better when dressed at rather long intervals. Any exuberant granulation tissue which may develop during the process of healing is removed either by means of lunar caustic, or, if excessive, by means of the scissors. At each dressing, both the ear and the wound are irrigated with a solution of bichloride of mercury, of a strength of 1-5000. In irrigation, it should be remembered that the wound should always be washed out first, to avoid infection from any accumulation of pus in the middle of the ear or aditus ad antrum. Another point may be worthy of mention here, namely, that in many of these cases it is by no means necessary to establish "through and through" drainage. If the opening in the mastoid cells is large, the fluid injected into the wound may not pass out through the external auditory meatus, although the probe may be passed directly into the middle ear. It is always unwise to employ undue force to establish this return current. The operator can easily

assure himself, by means of the probe, that the opening between the mastoid and the middle ear is perfectly free, and if this condition exists, the object of the operation has been attained. Where posterior drainage is perfect, the opening in the drum membrane closes very rapidly, and this would prevent "through" drainage on irrigation.

The wound in the soft parts heals rapidly, and at the end of two or three weeks it is usually possible to dispense with the bandages, and to retain the dressing in position with a properly formed pad, thus leaving the ear exposed. If the otorrhœa persists, the patient is directed to irrigate the ear twice daily with a solution of bichloride of mercury, 1-5000. In the majority of cases, however, all discharge from the ear ceases soon after the operation, and local treatment is unnecessary.

Regarding the dangers of the operation itself, they may be considered as practically *nil*. For this reason it is always wise, whenever the surgeon is in doubt as to the presence of pus in the mastoid process, to do an exploratory operation. If no pus is found, no harm has been done, while, if there is deep-seated suppuration in the bone, delay may be followed by the gravest results.

Certain accidents may occur during the course of the operation, in spite of the greatest care on the part of the operator. These are, either the exposure or opening of the lateral sinus, or the exposure of the meninges in the middle cranial fossa. None of these accidents in any way increases the danger of the operation, provided proper aseptic precautions have been observed. It is hardly necessary to state that, at the present time, no surgeon is justified in undertaking such an operation who is not familiar with the technique of aseptic surgery. If the lateral sinus is wounded accidentally, the hemorrhage is easily controlled by firm pressure with a pledget of gauze over the bleeding point. This plug is held in position by an assistant, and in the course of a few minutes the hemorrhage will entirely cease. Herein lies the advantage of a large opening in the bone in all of these cases. If the mastoid cortex

is not removed over a large area, an accidental opening of the sinus makes it impossible for the operator to proceed. In other words, the pus in the mastoid antrum is not evacuated, and the patient remains unrelieved. On the other hand, if the cortex has been removed over a considerable area, it is possible to control the hemorrhage from the sinus, and to continue the operation and enter the antrum at some other point. An investigation of the cases in which death has followed injury of the lateral sinus will show, I think, that the fatal issue has been due, not to the opening of the sinus, but to the retention of pus in the mastoid itself. In other words, the object for which the operation was performed had not been accomplished, and the patient was practically in the same condition after the operation as before.

My experience in a large number of cases has led me to believe that the mere exposure of the meninges in the middle cranial fossa does not render the prognosis more grave. In no case have I seen infection occur through such an accident.

In regard to the technique of the Stacke-Schwartz operation, a few words may not be out of place. By this procedure the operator converts the mastoid cells, the vault of the tympanum, and the tympanic cavity into one large chamber, continuous with the external auditory meatus. The technique of the procedure is as follows: The incision through the soft parts is made in the manner already described in explaining the technique of the mastoid operation. The upper end of the incision is carried a little further forward, however, to completely detach the auricle above, thus allowing an easy exposure of the entire superior margin of the bony meatus. The lower portion of the incision over the mastoid tip is also carried along the anterior border of the process to allow complete exposure of the inferior margin of the bony meatus. The mastoid antrum is entered in the manner already detailed. The operator then dissects off the periosteum from the posterior, superior, and inferior walls of the bony meatus, as

far as the drum membrane. The canal is then divided transversely as closely to the drum membrane as possible, and this fibro-cartilaginous tube is forcibly drawn out of the bony canal by strong traction upon the auricle. This is best accomplished by threading a strip of gauze through the external auditory meatus and the incision in the posterior wall of the canal. The two ends of the gauze are then tied together, and firm traction is made. In this way the posterior, inferior, and superior walls of the bony meatus are fully exposed. By means of the chisel the deep portion of the upper wall of the canal is cut away, thus securing free access to the tympanic vault. The operator then proceeds to break down the posterior wall of the canal, thus removing the bony partition between the opening already made in the mastoid and the bony external meatus. This is effected by means of the chisel or gouge. The only possible accident in carrying out this step is injury to the facial nerve. This may be avoided if the chisel is used carefully. The upper portion of the posterior wall of the canal should be removed first, thus exposing the aditus ad antrum. The facial nerve lies close to the posterior margin of the tympanic ring at the junction of the upper and middle third. If the posterior wall of the canal is not destroyed below this point, no injury can be done to the facial trunk. It is hardly necessary to say that the operator must be careful not to injure this structure where it crosses the middle ear in the aqueductus Fallopii. Such an injury can hardly occur, however, if even ordinary care is exercised during the operation. After the mastoid cells and the tympanic vault have been converted into a large cavity, which is really a dilated bony external meatus, all carious bone should be removed from the middle ear and mastoid, by means of the curette. The instrument should be used with care, so as not to wound important structures, and the operative field should be kept constantly in view. This is easily done if the parts are sponged rapidly. By drawing the auricle well forward, the remnant of the drum membrane and the ossicles are easily seen. It is seldom

that the carious process destroys the ossicles completely, the head of the malleus and a portion of the incus being usually left, even in cases where the disease has lasted for a long time. The fragments of the ossicular chain should be removed carefully, by means of the forceps, care being taken to separate them from the stapes, so as to avoid any injury to the labyrinth. In curetting the internal wall of the middle ear, the operator should direct an assistant to watch carefully the face of the patient, so that any contraction of the facial muscles may be recognized at once. A sudden contraction of the facial muscles, upon the affected side, is due to a mechanical irritation of the trunk of the nerve by the curette. If this precaution is taken, serious injury to the trunk of the nerve is practically impossible. Particular attention should be given to the condition of the tympanic roof, and all softened bone should be removed.

The next step is to replace the auricle, and to line the large cavity continuous with the bony canal with integument. This is done by reflecting flaps of the cutaneous lining of the bony meatus into this large space. Several methods have been suggested in regard to the manner of forming these flaps. My experience has been that the conditions vary so much in different cases as to make the application of any special rule impossible.

Certain rules, however, are applicable to all cases. The fibro-cartilaginous canal, which had been displaced forward during the operation, is split horizontally along the posterior wall. This incision may be made either in the median line or above or below this, according to the particular conformation of the parts. In this way two triangular flaps are formed, one of which is forced upward into the mastoid antrum and the other downward into the lower part of the mastoid. The most common error is to make this incision too short. No damage is done if the incision extends as far as the middle of the concha. If it seems desirable, a second cut may be made at right angles to this first incision, thus permitting the flaps to be more accurately applied to the cavity in the bone. It is sometimes wise to remove a

portion of the cartilaginous framework of the meatus and auricle, leaving only the integument to form the lining of this bony cavity. It is my usual practice to unite the periosteum lying just behind the bony opening to adjacent portions of the flaps formed as above described, by means of deep sutures either of boiled silk or silkworm gut. The ends of these sutures are left long and either carried into the meatus or brought out through the wound, in order to admit of easy removal. The superficial wound is then closed throughout by means of interrupted sutures. These sutures may be either of catgut, silkworm gut, silk, or silver wire; my own preference being boiled silk. It is important, in closing the lower portion of the wound, to completely obliterate the "dead space" formed by the removal of the tip of the mastoid. If this is not done, the serous effusion from the wound drains into this space and complete primary union is seldom obtained. This space may be obliterated either by passing a silk suture very deeply, so as to include the divided tissues throughout the entire depth of the wound, or by uniting the deep tissues with buried sutures of fine catgut, the superficial wound being closed in the manner stated above. The cavity in the temporal bone resulting from the amalgamation of the mastoid cells and tympanic vault is then firmly packed with iodoform gauze introduced through the external auditory meatus; care should be taken to completely fill the cavity. If this point is not observed, exuberant granulations may spring up from the denuded surface, and delay the convalescence. The entire ear and the field of operation are then covered with an antiseptic dressing, which is allowed to remain in place for six or seven days, unless pain or temperature indicates that its removal is necessary. At the end of this time, the superficial sutures should be removed. The deep sutures which have been carried either into the canal or through the wound are allowed to remain undisturbed and usually come away on the tenth or twelfth day. It is seldom necessary to change the dressing more frequently than every fourth or fifth day. At each dressing the cavity is thoroughly

irrigated by means of an antiseptic solution. The parts are then dried by means of sterilized cotton, and the packing replaced in the manner already described. Where the superficial parts unite by first intention, the bandage can be dispensed with at the end of ten or fourteen days. It is then sufficient to protect the line of incision behind the ear with a few strips of sterilized gauze, held in position by collodion. The patient is directed to syringe the ear twice daily, in order to keep the parts thoroughly cleansed. Any exuberant tissue which may develop is destroyed by means of nitrate of silver or chromic acid. The discharge from the canal may not cease entirely for several months. It is usually insignificant in quantity, however, at the end of three or four weeks. When the discharge is very slight, the syringing may be dispensed with entirely, and the granulating surface covered with a thin layer of boric acid or a mixture of equal parts of boric acid and iodoform.

A word should be said in regard to the selection of cases to be subjected to this operative procedure. Where caries is limited to the ossicles, and to those parts of the middle ear which can be reached by the instruments introduced into the meatus, I am decidedly of the opinion that the removal of the carious ossicles and thorough curettement of the middle ear through the canal is followed by equally satisfactory results. Where, however, the disease has extended to the mastoid process, there is no possibility of curing the aural discharge without performing the more radical operation already described. It has been frequently claimed that the posterior incision gives the operator a better view of the tympanum than can possibly be obtained through the canal. This, I think, is a mistake, and as far as the operation upon the tympanum itself is concerned, the surgeon will be able to work much more exactly through the canal than through the posterior opening. The choice of operation, therefore, should depend entirely upon the extent to which the bone is involved. If the tympanum alone is affected, the simpler operation is unquestionably preferable.

In 74 cases the ossicles were removed and the tympanum thoroughly curetted, with the following result: Cured, 46; improved, 19; result unknown, 8. In one case the result seemed satisfactory at first, but later a Stacke-Schwartz operation was required.

In 14 cases the Stacke-Schwartz operation was performed: Cured, 9; improved, 4; under treatment, 1.

Although it hardly lies within the scope of this paper to discuss any operative measures for the relief of intra-cranial complications, these are so common in mastoid suppuration that the author feels justified in alluding briefly to the operative technique in these cases. When the surgeon believes that there is involvement of the lateral sinus, as evidenced by sudden and pronounced elevation of temperature followed by spontaneous defervescence, he is warranted in exposing the lateral sinus, as this is the channel most frequently involved in mastoid inflammation. The location of the vessel, as before stated, varies considerably in different subjects. Most frequently the sinus will be exposed by entering the cranial cavity at a point half an inch behind the posterior wall of the meatus. It is hardly necessary to say that the most rigid aseptic precautions should be taken when it is the intention of the operator to expose this venous channel. The vessel may lie either in front or behind the normal situation; it is best exposed by means of a large gouge or by the dental burr. While I would not favor the careless use of instruments in this region, it is not necessary to greatly prolong the operation to expose this vessel. If the gouge is used, a few blows of the mallet will suffice to remove the inner table of the skull. After the cranial cavity has been entered, the rongeur forceps should be employed to enlarge the opening upward and downward, and if the sinus is not immediately recognized, the wound should be enlarged backward with the same instrument. It is never wise to open the venous trunk without first exposing it for a considerable distance. Tactile exploration goes far in determining whether the lateral sinus is normal or whether it is occluded by

a thrombus. In many cases, however, the operator is in doubt, and in these instances it is justifiable to introduce a sterilized aspirating needle into the sinus. If normal fluid blood is withdrawn, there is every reason to suppose that the channel is patent, and that further operative procedure is not required. If, however, no blood is withdrawn on exploratory puncture, or if aspiration yields a few drops of foul-smelling pus or blood, the operator should open the sinus freely. This is best done by making a short longitudinal incision with a small scalpel, and enlarging it with a small blunt scissors. If the thrombus is found, it is removed by means of a small curette. As a rule, I carry the curette downward toward the jugular bulb, removing the deeper portions of the thrombus until free hemorrhage occurs from below. In many cases the clot will be so extensive as to render it necessary to expose the sinus for a greater distance. In two instances I have followed it downward and forward to within an eighth of an inch of the jugular bulb before the occlusion was relieved and free venous hemorrhage occurred. As soon as this takes place, a strip of iodoform gauze is forced into the lumen of the sinus and packed firmly downward by means of the probe. This controls the hemorrhage easily. This tampon is held in position by an assistant, who exerts rather firm pressure upon it. The operator then explores the sinus in the opposite direction, toward the torcular Herophili. If necessary, the bone is removed in a direction upward and backward, and the wound in the sinus enlarged until curettement is followed by free hemorrhage. This end of the wound is then packed with iodoform gauze in the manner already described. After firm pressure upon these tampons for a few moments, they are removed, and the open sinus is washed out thoroughly with a normal salt solution. It is an advantage, I think, to allow the sinus to bleed rather freely, as, in this way, any detached fragments of the thrombus are expelled by the blood current. Where it is necessary to follow the sinus downward to the jugular bulb, it is wise to have an assistant compress the internal jugular in

the neck, so as to prevent the entrance of air into the vein. Such an accident has happened in one or two cases reported, and is always to be guarded against. After thoroughly cleansing the sinus, it is firmly tamponed with iodoform gauze. In dressing the wound it is important to protect the exposed sinus as completely as possible. This is best effected by packing the mastoid cavity in the usual manner, without disturbing the tampon in the blood vessel. After this has been done the anterior portion of the wound is covered with a gauze sponge, and the gauze occluding and covering the sinus is removed. This portion of the wound is then packed with fresh iodoform gauze. The sinus is thus completely isolated from the middle ear and mastoid antrum, and no infection can possibly occur. At the time of the first dressing, it is wise to leave the packing about the sinus undisturbed until the gauze has been removed from the mastoid antrum, and the parts are completely cleansed with an antiseptic solution. The aditus ad antrum, and the antrum itself, are then loosely packed with a strip of iodoform gauze, covered with a cotton sponge, and the sinus wound dressed separately. This portion of the wound is then packed as above described, after which the temporary tampon in the mastoid is removed, and the dressing is completed in the usual manner.

Secondary hemorrhage from the sinus, either a few hours after the operation, or at the time of the first dressing, is a rare occurrence, and I have never observed it in my own practice.

In certain cases the surgeon is not consulted until the evidences of systemic infection have existed for some time, and the thrombus may have extended from the sinus into the internal jugular vein. This condition is characterized by tenderness along the anterior border of the sterno-mastoid muscle, and by the presence of a hard cord-like band, easily recognized upon palpation, following the course of the internal jugular. The overlying tissues are also somewhat swollen, and the patient usually complains of spontaneous pain in this region.

In any case of suspected sinus thrombosis, the neck should always be examined, as jugular involvement may follow occlusion of the sinus in a very short time if the septic process is virulent in character.

If the vein is occluded, it must be exposed and divided between two ligatures as low down as possible to prevent systemic infection. It is also wise to ligate both the facial vein and the short trunk which joins the external jugular to the internal. The sinus is dealt with in the manner previously described. It should be remembered that hemorrhage from below, on opening the sinus, does not prove that the jugular is free. Even if the vein is completely occluded, free bleeding may occur, the source of the hemorrhage being the inferior petrosal sinus.

Occasionally the sinus will be found occluded by a firm organized clot, and all efforts to restore its patency fail. When this condition exists the symptoms of systemic infection are wanting, and there is no indication for ligation of the jugular. The organized clot is the result of a previous inflammatory process, and is an evidence that there is no danger of a general infection.

Where the symptoms are so obscure as to render the location of an intra-cranial lesion a matter of conjecture, it is important, I think, to render it possible to expose, through a single incision in the soft parts, the mastoid antrum, the lateral sinus, the middle cranial fossa and the cerebellar fossa. It should be remembered that time is an important element in these operations. If the operation is so conducted as to render several incisions through the soft parts necessary, the hemorrhage from the superficial tissues causes considerable delay, and the procedure is unnecessarily prolonged. I also differ from many eminent authorities as to the advisability of first entering the mastoid antrum in all cases. Where the symptoms seem to indicate distinctly that the lesion is in either the middle cranial fossa or in the cerebellum, it is unquestionably wise to relieve this condition immediately. It is true that the process has extended from the middle ear or mastoid, but

the immediate symptoms are due to the intra-cranial involvement. Frequently the patient is in no condition to warrant a prolonged operation. If the intra-cranial condition is first relieved, recurrence may be prevented by a second operation upon the mastoid and middle ear. In all cases, therefore, where intra-cranial involvement is suspected and the patient is very weak, the incision is made as follows: The knife is entered just below the tip of the mastoid and carried down to the bone. It is then carried upward, following the line of insertion of the auricle, and forward as far as the external angular process of the frontal bone. From a point just above the auricle, a second incision is made downward and backward to a point just below the occipital protuberance. In this way free access may be gained to the middle cranial fossa, the middle ear and mastoid antrum, the lateral sinus and the cerebellar fossa. In forming the posterior flap, the periosteum is not disturbed, the soft parts alone being reflected. Where there is special need of rapidity, it is convenient to apply T-clamps to the margins of the flaps, thus quickly controlling the hemorrhage. If the location of the intra-cranial lesion is obscure, and the patient is in good condition, the first step is to rapidly enter the mastoid antrum by means of the chisel; if the patient is weak, this may be omitted. If sinus involvement can be excluded, this vessel need not be exposed, and the first step should be to enter the middle cranial fossa. This is done by exposing the squamous portion of the temporal bone above the zygoma and just in front of the external auditory meatus. The periosteum is separated with the elevator, and the cranial cavity is easily entered by means of the gouge, a few strokes of the mallet sufficing to perforate the bone. This opening is enlarged downward and backward by means of the rongeur forceps until the index finger can be introduced into the cranial cavity. If infection has taken place through the tympanic roof, and an extra-dural collection of pus is present, this can be evacuated by passing the finger along the upper surface of the petrous pyramid and carefully separating the

meninges from the underlying bone. This should be done as a primary procedure. If no pus is found, the dura is raised by means of toothed forceps, and divided with delicate scissors, so as to form a curvilinear flap. This flap is deflected downward, and the brain substance explored in various directions by means of the aspirator, for the purpose of detecting any intra-cranial collection of pus. If the result of the exploration is negative, the wound is washed with a sterilized normal salt solution, and the edges of the dura brought together by sutures. The soft parts are allowed to fall naturally over the opening in the bone, and a towel moistened in 1-3000 bichloride is placed over the entire wound.

If the sinus is to be exposed, the operative technique already detailed is followed. If it seems desirable to explore the cerebellar fossa, the cranial cavity is entered at a point about two and a half inches behind the center of the meatus, and about a quarter of an inch below this level. Roughly speaking, the opening is made between the superior and inferior curved lines of the occipital bone. In this locality the skull is very thin and is easily perforated by a large gouge. The wound is then enlarged with the rongeur forceps, and a dural flap reflected and the exploration of the cerebellum conducted as already described.

If an extra-dural collection of pus is found in exploring the middle cranial fossa, and if the surgeon considers this sufficient to explain the symptoms of the patient, no further operative procedure is necessary. After the pus has been evacuated, the next step is to enter the mastoid antrum, unless this has already been opened. After the antrum has been freely opened, the upper wall of the canal, which forms the floor of the middle cranial fossa, is broken down with the rongeur forceps, to facilitate free drainage. A narrow strip of iodoform gauze is then carried to the deepest portion of the wound and the entire cavity is thoroughly packed. The antrum and the middle ear must be isolated from the exposed dura in the manner already described in considering sinus thrombosis.

If a brain abscess is found in the temporo-sphenoidal lobe or in the cerebellum, the exploring needle is allowed to remain in position, and, with this as a guide, a sharp knife is passed into the brain substance, and made to incise this sufficiently to admit of the introduction of the index finger. This is carried carefully into the abscess cavity, and all softened tissue broken down. Many operators, notably McEwen, advocate the packing of the abscess cavity with a mixture of iodoform and boric acid. My own practice, however, has been to carry a narrow strip of iodoform gauze into the cavity, securing drainage by this method. If the incision through the dura has been extensive,—and this, I think, is always wise,—it may be partially closed by means of sutures, sufficient space being left for the passage of the gauze drain, and to allow free access to the abscess cavity at subsequent dressings. The external wound should not be closed throughout its entire extent, the lower and anterior angles alone being brought together by means of strong silk sutures. The remainder of the superficial wound is packed lightly with gauze, so as to allow easy access to the deeper parts. An antiseptic dressing is applied over the entire field of operation, and this is not disturbed for six or seven days, unless urgent symptoms indicate that its removal is necessary.

The advantage claimed for this method of procedure is that the time of operation is shortened considerably. With a little experience, it is possible to open the mastoid antrum, expose the lateral sinus, the middle cranial fossa, and the cerebellar fossa, and to complete the entire operation in one hour, or even less. The point to be emphasized is that the surgeon should have a definite idea of what he is going to do before the operation is begun, and that no time should be lost in discussing the possibilities and probabilities after the cranial cavity has once been entered. Anyone conversant with traumatic surgery of the brain knows that exposure of the meninges, and of the brain itself over a considerable area, is not serious, provided the parts are kept thoroughly aseptic, and the ex-

posure is not prolonged. I think that many of these cases would recover if the time of operation could be shortened, thus diminishing the shock.

In support of the position assumed by the author, the following record of his own operative work is added :

Mastoid operations, 192* : Cured, 183 ; died, 9.

Acute meningitis, 1, cured.

Mastoid cases, with intra-cranial complications : (a) Epidural abscess, 8 cases, cured. (b) Sinus thrombosis, 9 cases ; cured 8 ; died 1 (death due to acute nephritis). (c) Brain abscess, 1 case, death.

The fatal issue in the remaining 7 cases was probably due to the following conditions, although a necropsy was not possible in every case : Facial erysipelas, 1 ; meningitis, 3 ; abscess of brain, rupturing into lateral ventricles, 2 ; acute nephritis, 1.

* This does not include the cases operated upon by the Stacke-Schwartz method, and previously reported.

NASAL CATARRH DUE TO OBSTRUCTIVE CONDITIONS.

BY ROBERT CARR BLOCK, M. D., ST. LOUIS.

FOR the sake of brevity, and the added reason that at least ninety per cent. of the chronic naso and nasopharyngeal involvements are due to obstructive conditions, I shall limit my paper to a consideration of this form of nasal trouble. With the laity generally, and, in fact, with many physicians, the old belief still prevails that nasal catarrh is incurable, and before the advent of the head mirror, cocaine, and other improved methods of diagnosis and treatment this was, to a certain extent, literally true.

A large majority of these conditions are due to a diseased state of the inferior turbinated bodies, resulting from their great vascularity and susceptibility to recurrent inflammation and consequent tissue changes of a hypertrophic nature. It should be remembered that the inferior turbinates are situated in the lower portion of the nasal chambers, which constitutes the respiratory tract, and a slight swelling of these tissues from any form of irritation or increase of blood pressure will often produce a marked stenosis and consequent imperfect inspiration. This, with adenoid growths—so common to infancy and the early years of life, nasal polypi, septal spurs, and septal deviations,—constitute the abnormal conditions we most commonly meet in everyday rhinological practice.

The two most frequent manifestations of nasal obstruction are difficult nasal respiration and a great susceptibility to recurrent coryzas, to which may be added one or many

of a long list of involvements. It is a well-known fact that ocular disturbances are often dependent upon intranasal conditions, and the intimate relations of continuity of structure and atmospheric pressure existing between the ear, nose, and nasopharynx render negative, in a large percentage of cases, the results of treating the former without due attention to diseased conditions in the latter.

Recurrent and obstinate attacks of headache often result from intranasal pressure, and the same is true as to the ætiology of asthma and hay fever, while chronic pharyngitis and laryngitis are among the common sequelæ of nasal stenosis and consequent mouth-breathing. The picture of altered facial expression, malformation of features, snoring and interrupted slumber, with evidences of general malnutrition in the victims of adenoid developments, is familiar to every observant physician.

I have selected a few cases from my clinical record illustrative of some of the above conditions:

Mr. B., aged forty; history of recurrent head-colds for past five years; mouth breathing; profuse secretion in nasopharynx, chronic and very annoying; laryngeal cough. Inspection showed marked hypertrophy of both inferior turbinates, impinging on the septum, catarrhal patches in vault of pharynx, and hyperæmia of vocal bands and laryngeal mucous membrane. Removed longitudinal section of left inferior turbinate, and cauterized left inferior turbinate, restoring patency of nares and relieving every disagreeable symptom.

Mr. C., aged thirty-nine; history—frequent and severe attacks of asthma for past ten years; imperfect nasal respiration. Upon examination found both inferior turbinated bodies hypertrophied and numerous small polypoid growths in both upper anterior and posterior nasal chambers.

Reduced hypertrophies and removed polypi, cauterizing bases. The tendency to recurrent and new-growth polypi was most persistent in this case, producing always asthmatic attacks, and clearly showing ætiology of the latter. For the past six months he has been free from polypoid growths with no return of the asthma.

Miss J., aged twenty. Annual attacks of hay fever; onset about July 15, lasting until frost. At other seasons a great suscepti-

bility to head-colds. Examination showed marked hypertrophy of both inferior turbinates and consequent obstructed respiration. Removed portion of each lower turbinate. There has been no return of hay fever for past three years, and comparative immunity from the coryzas.

C. B., aged five years. A typical case of adenoid obstruction, evidenced by malnutrition, mouth breathing, altered facial expression, mental dullness, snoring, and restless slumber.

Inspection showed hypertrophied tonsils and vault of pharynx filled with adenoid tissue (these two forms of glandular development are frequently found together). Under chloroform anæsthesia, I ablated the tonsils and curetted out a large amount of tissue from vault of pharynx. The results, as always in these cases, were most gratifying. Restored normal nasal respiration, with improved color, nutrition, and weight.

Bearing in mind the important physiological functions of the nose,—filtering, warming, and moistening the inspired air,—and the lesser ones of olfaction, resonance of the voice, and regulation of atmospheric pressure, the necessity is plain of maintaining these uninterrupted. Unfortunately, the field of surgical treatment is one not open to the general practitioner (with possibly few exceptions), requiring as it does special training, experience, and skillful operative measures within small cavities.

I believe no other line of surgery offers results always satisfactory, and oftentimes brilliant, with no risk to life, and little attending pain or inconvenience to the patient.

Dr. Pyncheon of Chicago, in a recent able article, draws the following conclusions, which, I believe, are held by every intelligent rhinologist.

(1) That chronic nasal catarrh is chiefly a structural disease.

(2) That impairment of ventilation and drainage of the nasal fossæ are the most important causative elements.

(3) That the touching of opposing surfaces is one of the most important pathological factors.

(4) That the line of treatment is largely surgical, and the chief object aimed at is to cause the defective nose to conform as nearly as possible to the shape of the ideal standard.

SUBMUCOUS OPERATIONS WITHIN THE NOSE AND THROAT.

BY C. GURNEE FELLOWS, M. D., CHICAGO.

WITHIN a comparatively short time intranasal surgery has received such an impetus that many physicians with only half-knowledge have attempted operations within the nose, which have not only been useless, but have made the second condition worse than the first, so that recently there has grown up a reaction against promiscuous nasal operations. The galvano-cautery can be so easily used that it has been often abused, and those who advocate it most are just as positive in their restrictions as to its use. Two or three years ago the turbinateds were frequently removed, and such instruments as the spokeshave were invented and sold broadcast, but now the colleagues of the inventor of this instrument declare that it is almost never necessary to use it; and if they so decide, how much more careful should outsiders be in adopting such radical measures.

The whole purpose of intranasal operations, as a rule, is to increase the normal breathway and render nasal respiration possible, and if it can be done, as is possible many times, without an operation, so much the better; but when an operation is necessary the simplest one possible should be chosen. As, for instance, with a deflected septum or a spur in contact with the hypertrophied turbinate, the lesser operation is to attack the septum, because of less physiological function attached thereto; as a last resort the turbinates should receive attention. The plan for the removal

of the septal spurs is still by means of a saw, trephine, or some modification of one of these, and it gives most brilliant and immediate results. But if it is possible to retain the mucous membrane covering the exostosis, it should be done.

I am very glad to say that in the past few years I have only twice removed the entire inferior turbinate, and within the last several months I have cauterized but few. In distinct hypertrophy, and especially of the hyperplastic enlargements, the following submucous operation acts well:

I take a long nasal knife, similar to a Graefe or cataract knife, and entering it at the end of the turbinated, push it as far back as the enlargement is found, keeping it close to the bone, and freeing the body by turning the knife up and down as much as in my judgment seems feasible. The hemorrhage is comparatively slight, and under cocaine anæsthesia the pain is almost nothing. Now with a previously prepared bead of chromic acid on the end of a silver probe I thoroughly cauterize the tract just made in the turbinated body. The galvano-cautery as well may be used under some circumstances—trichlor acetic acid or any other well-known acid cautery agent. The reaction is slight; no packing is necessary, which is a great relief to the patient, and the results are very satisfactory. It may be also recommended to perform the first part of the operation with the knife alone, as the hemorrhage and contraction following the severance of the venous sinuses may be sufficient.

A similar type of operation, varied only in detail, is applicable to certain forms of hypertrophied tonsils, both faucial and lingual. The operation known as ignipuncture is practically a submucous operation, as it may be made so either by cutting into the tonsil by means of a heated cautery knife or, what is often simpler, by previously making the opening with a sharp knife, as suggested in the turbinated.

This form of ignipuncture is applicable to children or to those who refuse radical operation, as well as to those cases

of flat tonsils with exudation from the crypts, and where a tonsilotomy does not seem possible. The application of hydrochloric acid by means of a glass rod to the crypts of the tonsils, although not strictly a submucous operation, may be classed as such, because it is done underneath the surface and is very efficacious.

Of course these operations are not in any way necessary when radical work is not demanded, as experience teaches us that, like the law of similars, we should treat our patients and cure them by the easiest and quickest means possible.

These lesser operations do not at all do away with the more radical ones, particularly in a question of the tonsils, but the facts cited are simply an indication of a means of getting around a more bloody or severe operation in the case of children or timid adults; and it is possible, being less radical, the results may be equally as good, though possibly a little longer in being attained.

TWO CASES OF MASTOID DISEASE.

BY CHARLES DEADY, M. D.

THE cases cited below presented for treatment in my clinic at the New York Ophthalmic Hospital. In both instances the local pathological changes were extensive; in neither was the general condition affected to any extent—in the man not at all. Both made an excellent recovery:

CASE I.—J. M., male, æt. twenty-six, born in Russia, married, machinist by trade; came to the clinic February 18, 1898, complaining of pain in and behind left ear, apparently deep in bone. Described the pain as a dull aching. Gave the following history: Six weeks ago caught cold and had severe pain in the ear for twenty-four hours; then the ear began to discharge a mixture of pus and blood. This lasted for two days, when the blood disappeared, and thereafter the discharge was purulent. He had pain in the mastoid process from the beginning of the attack, and for eight days it was very severe; then it lessened, and for a while there was only discharge and a slight aching in mastoid process at times. He returned to his work, and was very comfortable for two weeks, when the pain again became troublesome; but, as it annoyed him only at night, he continued working at his trade until he came to the clinic. Examination showed perforated drumhead and scanty purulent discharge from ears; no swelling over mastoid process, no tenderness to pressure, no symptoms whatever but the discharge and an intermittent aching in the bone. Patient in excellent physical condition.

He was advised to go into the hospital for treatment, and was admitted February 21. He was put in bed, the ear carefully cleansed with hydrogen peroxide three times a day, and hepar 1

was given every two hours. The temperature was taken every three hours, but was always at or near normal; at most the elevation was two-fifths or three-fifths of a degree above.

For the first few days after entering the hospital the pain was absent; but it returned after about one week, though not with any severity. An exploratory operation was proposed, and, his consent being obtained, on the afternoon of March 4 he was placed upon the table, and, after the completion of the aseptic toilet, the operation was commenced by an incision of the soft tissues, beginning at the top of the mastoid process and passing upward, parallel to the attachment of the auricle, and about one-fourth inch behind it, to its termination above that organ. The integument and periosteum were now loosened and pushed back, by means of the elevator, until the bony process was uncovered throughout most of its extent, when, the bleeding having subsided, the parts were cleansed for examination. This revealed no sign of disease, the bone being white and firm, and to all appearances perfectly normal. The mallet and a large gouge chisel were now used, and the bony cortex carefully chipped away over the typical site of the antrum, smaller gouges being substituted as the work progressed. The antrum was opened without special difficulty, and thick pus made its appearance. With the bent chisel the cortex was then removed, in a direction toward the tip of the process, pus being constantly encountered, until the cells over the entire surface had been laid bare. The sharp spoon was then used, and the cells were broken down and removed, the bony tissue being found in a state of disintegration throughout. The diseased condition was found to extend to the tip of the process, which was removed, together with all the cells, to the internal table, and extending as far posteriorly as the lateral sinus, the latter being laid bare for a short distance and found to be healthy. The floor of the process having been thoroughly curetted, until only healthy bone remained, a probe was introduced through the antrum to the middle ear, and the aditus and attic were found to be in a condition which necessitated radical measures, the bone being softened and carious and the cavities containing much detritus. The cartilaginous meatus was therefore loosened and shelled out; and the periosteum on the postero-superior aspect of the bony canal being removed, the bony wedge separating the mastoid opening from the middle ear was chiseled away, and the

aditus and attic thoroughly curetted. The parts were then well irrigated with bichloride solution $\frac{1}{3000}$ and packed with strips of iodoform gauze, the cartilaginous meatus being slit up longitudinally and pressed into the mastoid opening by the packing. The lower edges of the primary incision were united by a suture, leaving the incision open through the greater part of its extent. A pad of iodoform gauze, sterilized cotton, and a roller bandage completed the toilet, and the patient was put to bed.

The first dressing was not removed for five days, at the end of which time the wound was found to be in excellent condition, and after irrigation with bichloride $\frac{1}{3000}$ it was again packed as before, the meatus auditorius externus being first filled until the gauze forced its way into the mastoid wound, in order to keep the edges of the split cartilaginous meatus pressed well into the opening into the mastoid process, the opening into the latter being packed afterward, and the whole bandaged as before. This was repeated every other day for about two weeks, the patient doing well. At the end of this period he was attacked by insomnia, which was persistent and troublesome for some days, reducing his strength and impairing his appetite to such a degree that unhealthy granulations made their appearance in the wound, and a small amount of tissue around the incision sloughed away. The granulations were touched with the solid stick of silver nitrate, and at each dressing after the irrigation the parts were flooded with electrozone. He was also put upon a more nourishing diet at this time, and, as a result of this treatment, the wound immediately began to clean up. The insomnia yielded to the administration of internal remedies, and from this time on he made steady progress. At the present time the wound is small, clean, and rapidly closing up. There is a free opening from the middle ear into the mastoid process, and the patient is practically well. Two or three times during the first four or five days after the operation the temperature reached $99\frac{3}{4}^{\circ}$; otherwise it has been at or near the normal continuously.

CASE II.—B. H. P., male, aged nine years; native New York City. First had suppurative inflammation of the middle ear about five years ago. Was taken at that time to Mt. Sinai Hospital Dispensary, and under the treatment the discharge soon stopped. Along about the holidays slight discharge began, which was offensive. The mother tried to keep it clean, but there had

been no treatment because the patient had not complained of pain or other symptoms until about February 22, when the ear became tender to touch and there was pain in and about the organ. A day later swelling became manifest behind the ear, and when first seen, February 25, he had considerable œdema and tenderness over the mastoid process, but complained of little pain. The temperature was nearly 101° . Immediate operation was advised, and with the consent of the mother he was at once placed upon the table. After the usual aseptic preparations an incision was made from the tip of the mastoid to the upper border of the auricle, and about one-fourth inch posterior to the insertion of the latter. There was an immediate flow of pus, and after cleansing and retracting the lips of the wound, a fistulous opening was found in the bone opposite and posterior to the external auditory canal. With a mallet and chisel the cortex of the bone was carefully chipped away, when it became apparent that a large proportion of the mastoid process was in a state of disintegration. All carious portions of the bone were chiseled away, the lateral sinus being laid bare for about one and a half centimeter of its course and found to be healthy; the antrum was thoroughly cleaned out; and, as the caries extended toward the middle ear, the postero-superior wall of the bony external meatus was removed throughout its extent, leaving a large, free communication with the middle ear. After thoroughly cleansing all the parts the wound was packed with iodoform gauze and bandaged, and the patient put to bed.

The temperature at once dropped to normal. On the day following at 5 P. M. it rose to $101\frac{3}{5}^{\circ}$; but immediately receded to $99\frac{3}{5}^{\circ}$, and only reached 100° twice again during the convalescence, seldom going more than three-fifths above normal. He made an uneventful recovery, which was apparently expedited after the first two weeks by the use of electrozone after irrigation. In this case the strips used for packing were saturated with electrozone, and the healing was very rapid. Patient is still under observation. The opening in the mastoid now measures about three-eighths inch vertically, and one-fourth inch antero-posteriorly; there is a free opening into the middle ear, and the interior of the cavity is perfectly dry and lined with a thin membrane continuous with and having the characteristics of the integument.

The mastoid wound was left open and packed in both

these cases, as in both a large amount of bone was removed and the lateral sinus laid bare, and it was thought better to leave the parts in a condition permitting careful examination and cleansing. The marked dissimilarity of symptoms existing in two cases—where the pathological conditions were practically identical is interesting—the boy (doubtless because of his youth) presenting all the typical symptoms formerly regarded as characteristic of mastoid disease, swelling, œdema, and tenderness over the process, and the tendency of the auricle to stand out from the head; the man having absolutely nothing but a discharge from the ear and intermittent, deep-seated pain, which was not severe at the time he was seen and, except for the history of the case, hardly seemed to warrant operation.

MYCOSIS BUCCALIS ET TONSILLARIS.

BY C. E. TEETS, M. D., NEW YORK CITY.

THIS is a parasitic disease of the throat, characterized by the presence of whitish or yellowish deposits, which appear principally upon the tonsils, the base of the tongue, and the posterior wall of the pharynx.

This is not such a rare affection as some writers would have us believe, being frequently mistaken for chronic lacunar tonsillitis.

It is caused by the production of filaments of the *leptothrix buccalis*.

Nothing very definite is known as to the origin of this affection. I believe, however, that an unhealthy condition of the mucous membrane is a predisposing factor, and that these parasites, carried in by the inspired current of air or migrating from some other portion of the oral cavity, are deposited upon the fauces. There finding a suitable soil for their development, these small, thread-like bodies augment rapidly by fission, a process of self-division consisting of a gradual division of the body into two parts, each of which becomes a separate and independent organism. They become implanted in the epithelial layer, forming in clusters, and appearing as pointed patches or smooth plaques.

I cannot agree with some authorities who are of the opinion that this disease, or this mycosis leptothricis, is dependent upon caries of the teeth. I have examined several patients where this *leptothrix* fungus was present in the fauces, yet the teeth were in a healthy condition. If we

consider how many cases we examine in which there is caries of the teeth and yet how uncommon it is to find mycosis, we are led to the conclusion at once that this is not the primary source. Wagner claims that these parasites occur at times in everyone, and that they are to be found in the sediment around the teeth and in the thick brown coating on the tongue, waiting for a favorable opportunity to migrate to some diseased tissue where they may multiply and take on increased vigor.

Mycosis leptothricia may occur upon the tonsils, the pillars of the fauces, the posterior or lateral walls of the pharynx, and are also sometimes seen upon the pharyngeal and lingual tonsils. When occurring upon the faucial tonsils, they occasionally accumulate within the crypts, but more frequently close to the orifices.

The disease occurs in two forms, diffuse and circumscribed. The circumscribed form attacks mainly the outer layers of epithelium, and, standing out from the surface of the mucous membrane, appears as small wart-like projections. When diffuse, this organism extends more deeply into the mucosa.

Sometimes the deposit is soft and can be easily scraped off, but in other instances it is quite hard, adhering tenaciously to the mucous membrane, and very difficult to detach.

Women are more prone to the disease than men.

There is no constitutional disturbance, but the patient complains of a pricking sensation or a feeling as if a foreign body, such as a fish bone or a bristle from a tooth brush, had lodged in the throat. There may be stiffness and dryness of the throat, and this deposit may cause some alteration of the voice.

It is frequently mistaken for acute and chronic lacunar tonsillitis.

In lacunar tonsillitis there are inflammation and swelling, accompanied by the usual symptoms of acute tonsillitis—pain, fever, and a collection of soft yellowish secretions in the lacunæ which can be easily wiped off.

In mycosis the surrounding mucous membrane is healthy; there is also absence of fever and pain, while the growths are white and firmly adherent.

It is possible to have an acute lacunar tonsilitis occur during the course of mycosis, accompanied by the usual symptoms of lacunar tonsilitis. But the pain, fever, and swelling will soon disappear, as lacunar tonsilitis has a brief history, while mycosis has a prolonged course. In chronic lacunar tonsilitis the deposit is within the lacunæ, and is not adherent; the tonsils are also usually enlarged. In mycosis the deposit is in small masses found on the mucous membrane, and frequently remote from the orifices of the crypts, with no bad odor, and dislodged with great difficulty; while the tonsils are usually of normal size.

This affection has an essentially chronic course, and when the masses are scraped off they have a tendency to recur speedily, but appropriate treatment effects a cure without much difficulty. They sometimes disappear without the intervention of any form of treatment.

Different forms of treatment have been advised, but the most effectual method for the eradication of this fungus growth is as follows:

A four per cent. solution of cocaine is first applied to the part to be treated, then each mass is carefully touched by the galvano-cautery point, six or eight being treated at each sitting; this to be followed by an application of campho-phénique. This process should be repeated every five days until all the growths have been destroyed. I also advise a gargle of Pankotine, one part to three of water, night and morning.

The teeth should be carefully attended to, in order to destroy any nidus.

NASAL HEMORRHAGE.

BY H. F. FISHER, M. D., O. ET A. CHIR.; KANSAS CITY, MO.

EPISTAXIS (nosebleed) is a very frequent occurrence, but seldom of such severity as to demand the services of a physician to control it. It is harmless, unless of long duration or occurring from a diseased condition. In certain diseases epistaxis is a forerunner of death, while in others it is a favorable sign. A comparatively small amount of blood passing from the nose appears much greater because the patient sees every drop. A much larger quantity might escape from any other orifice of the body, or from a severed vessel, without causing the least apprehension, but the effect of a severe nasal hemorrhage upon the nervous system is very depressing; the patient becomes frightened, the heart action is increased, and the bleeding aggravated. Usually the bleeding will yield without the interference of the physician, if the patient will lie quiet, better with the head hanging so the blood will come from the nostril instead of running back, and apply cold to the spine, or douche the nose with cold or very hot water, with a little salt or vinegar, lime or lemon-juice it it, or plugging the nostril with a cobweb, or some cotton or linen. If the physician is summoned, occasionally his presence will be all that is necessary, as the bleeding often ceases with the cessation of fear, but if this is not the case it will be necessary to resort to measures of relief.

Cleanse the nostril by douching with very hot water, and have the patient blow gently yet forcibly enough to expel the plugs and foreign substances; contract the

tissues, using a few drops of two to four per cent. cocaine applied with the spray, medicine dropper, or on cotton (sometimes this will control the bleeding), so that the place of bleeding may be seen, and a styptic applied directly to it. Peroxide of hydrogen applied in the same manner will sometimes control the bleeding entirely; it surely cleanses the nares and makes them antiseptic. When the latter comes in contact with the blood it foams and afterward becomes more solid, often hanging in long pieces from the nostril (which portion should be cut away with the scissors, leaving the balance in place). If these measures do not prove effective cleanse the nostril and apply lime- or lemon-juice pure, a strong solution of tannic, acetic, or gallic acid, persulphate of iron, or a saturated solution of ammonio-ferric-alum; or a plug saturated with any of these solutions or the tinctures of rhatany, geranium, ledum, melilotus, bryonia, or other hemostatic. If these measures fail then it will be necessary to resort to posterior and anterior plugging.

Remembering the size of the posterior nares, it will be necessary to make a plug of absorbent cotton or fine linen, about the size of the end of the thumb when tied firmly in the middle, with a strong, preferably twisted, string, doubled, extending about eighteen inches from the plug in both directions. Then, having cleansed the nostril again pass a Bellocq's canula, a soft rubber catheter or tubing, or any suitable instrument, or a wadded string through the bleeding nostril into the pharynx and below the soft palate, grasp it with the fingers or forceps and draw through far enough to tie the string of the plug to it; then, placing the finger above the string and at the base of the soft palate, draw the plug in and when it reaches the end of the finger pass the latter behind the soft palate, drawing it toward the front and pull the plug above it into position in the naris. If the plug is in the proper position it will be impossible for the patient to breathe through it. Sometimes it is necessary after the plug has passed the soft palate to push it

into the proper place with the finger; then, by a quick firm pull, set it tightly. Having accomplished the posterior plugging it will be necessary to plug anteriorly with absorbent cotton, fine linen, or a small piece of handkerchief made umbrella shape filled with any material that may be convenient. The absorbent cotton is loosely rolled to about the size of the little finger, on a cotton carrier, probe, knitting needle, or smooth wire, dipped into the desired styptic, and pressed firmly into the nostril below the posterior plug string, which latter is then divided and firmly tied over it, that neither may become loosened. I have had one case where the posterior and anterior plugs were not tied together in which the bleeding was so profuse that the posterior plug was loosened and the anterior plugs forced out, and nothing would keep them in place. The hemorrhage in this case was controlled after eighteen hours profuse bleeding by the posterior plug, which had been in place all this time, and the Monsell's solution, full-strength, used for seven hours every time the blood oozed.

The posterior plug should never be left in place over forty hours and, on account of the odor, seldom over twenty-four to thirty, as there is danger of septicæmia. The removal of the plug is quite as difficult as its insertion. The string over the anterior plug should be severed and the dressing softened with hot water, so that it may be removed without disturbing the mucous membrane or the clot. After the anterior plug has been removed flush the nostril with hot water until some of it passes into the throat, when the plug is soft enough to remove by gentle traction on the other end of the string tied to the plug when it was introduced, placing the finger between the string and soft palate that the latter be not injured, and that the plug may be pulled *downward* into the oro-pharynx and out of the mouth. Occasionally there will be some slight bleeding immediately after the removal of the plug, but this generally ceases in a moment. To be ready for the reintroduction of a plug I have made it a rule to tie a

strong string to the string protruding from the nostril and introducing it as the plug is removed, having another plug ready to put in place if necessary; it causes the patient little if any inconvenience, makes him feel more safe, and if needed is ready. In two cases this silk string was left in position over a week, and in one it was necessary to use it without any assistance.

CASE I.—A. P., aged thirty; syphilitic history; blood squirting from the left anterior naris on the septum; had come five blocks hurriedly said; he was awakened by the blood on his face. Cocaine did not control it; it was stopped by a small quantity of persulphate of iron on a small piece of cotton held firmly in position for five minutes. This party came three or four different times with the blood squirting, and each time the persulphate was used the hemorrhage ceased. After the last treatment he had no more trouble for six years. Not seen since.

Cases II., III., VI., V., and VI., had been operated upon for removal of the turbinate body, and it was necessary to use post-nasal plugs in all of them to control the subsequent hemorrhage, while in one of the cases, after removal of the middle turbinate, the physician assisting placed the plug so firmly, and cut off the posterior oral string, that it was necessary to remove the plug through the nostril, which was done without causing renewed bleeding or deformity.

CASE VII.—K. M., aged twenty-nine; brunette; health not good for ten years; menstrual difficulties; much pain and little flow at the periods; told four years previously that unless she improved she would suffer with vicarious menstruation; had had menses two weeks before time on account of a railroad journey; and two days after the flow ceased the right middle turbinate was deeply cauterized; she had been apprehensive of some illness or accident for some time; four or five days after the operation the scab came away without any bleeding, and the second day after she returned home. On the 24th, her regular time for menstruating, after carrying a small bucket of water and a broom up the stairs, at the top of which she stooped, the blood "gushed from the nose in a stream," and by the time she got downstairs her mouth was filled and clothing very much soiled. Immedi-

ately physicians were summoned and administered melilotus and bryonia. The bleeding ceased shortly, but on the morning of the 26th she had a more severe bleeding spell than the previous one, and that evening had a still more severe one, all the while the blood smelling like the usual menses. That night posterior plugging was advised but refused. On the 28th she rested quietly and without any bleeding until ten minutes past midnight, when the hemorrhage began and was more profuse than ever, she vomiting large quantities of blood that had been swallowed during sleep, in all passing quite a gallon, half of it through the nose. At eight o'clock of the 29th she was given up to die by the attending physicians, but at noon was stronger; and a consultation was, decided upon which it was agreed to allow the posterior nasal plugging, although at that time there was no bleeding. The plugs were left in place for twenty-four hours, when the odor was so offensive the patient was nearly overcome by it; and as they were removed a new string was put in so that it could be used if necessary; the nose douched with water as hot as could be borne, and iodoform insufflated. Patient was given ergot, one-third teaspoonful doses, four times, and kept on mercurius every two hours with bryonia alternating. These and other remedies indicated were given as thought best. On the 7th of the following month, while attempting to stool, the bleeding began without warning, and was as profuse as at any previous time, the blood now being very bright. The prepared plug was tied to the string, that had been left in place for the last ten days, and inserted immediately; but we could not retain the anterior plugs in position, the bleeding pressing them out in spite of all methods used; and plugging would not control it. From 10 o'clock that morning until 1.10 that night the bleeding persisted, at intervals of five to ten minutes, in spite of the posterior plug, which would be forced loose if anterior plug was held in, and the use of peroxide of hydrogen, alum, acetic acid, gallic acid, tannic acid, ammonio-ferric-alum, rhatania ϕ , ledum ϕ , melilotus ϕ , and all other applications, the Monsell's solution, fresh, being used full-strength every time blood oozed from 5 P. M., until the bleeding ceased. The nose of this patient was a sight to behold that night, and was spread across the face in such a manner that the nurse said it would never resume its

normal shape. On the 8th at noon the posterior plug was extremely offensive and it was determined to remove all the plugs, for both nostrils were full of the persulphate of iron and blood. All this was removed, a new string inserted for future use if necessary, the nostrils thoroughly douched with water as hot as possible to bear, and iodoform insufflated. This treatment was repeated daily for a week, the string removed, and the patient recovered her health without further bleeding. With all this loss of blood not a single menstrual period was missed, and now, over a year afterward, there are a few flecks of blood from the nose before each menstruation, occasionally a drop or two during that period, and when she had a cold there may be a few drops—not more than ten. The sight of blood makes the patient shiver or feel faint, while before her trouble she would witness the most bloody operations without any distress. Before her illness she never weighed over 130 pounds, while she now weighs 155. Ten years previously this patient had a severe (supposed) pulmonary hemorrhage from suppression of the menses from cold. Eight years previous to the last attack she had carried a dead fetus two months, and has had two miscarriages since. In one instance there was very profuse and prolonged bleeding.

CASE VIII.—Mrs. W., aged twenty-seven; very anæmic; sallow complexion; as a girl had been subject to nosebleed, but for several years had none at all. In March, 1897, began to have nosebleed at fortnightly or semi-weekly intervals; in July was prostrated with the heat, and since then has been unable to work or to stoop over without the nose bleeding profusely. She is very weak, her limbs are stiff, and it is almost impossible for her to walk. Nose bleeds twice a day to twice a week, and the monthly flow is very irregular. Examination reveals all organs in proper position, and no defects in the nose, yet bleeding will occur without provocation. In February, 1898, was called to see her while bleeding, and as she was reclining the blood was running into the stomach. Placed posterior nasal plug and plugged anteriorly, which controlled the bleeding for the time. All the bleeding came from the sides of the triangular cartilage of the septum, sometimes oozing while looking at it. This bleeding became so persistent that her strength was almost gone. Temperature 103° ; pulse 140 and very weak. For six weeks the

triangular cartilage was covered with a thin pledget of cotton soaked in a solution of 10 grains each of tannic acid and anti-kamnia dissolved in as little alcohol as would hold this in solution. Before this could be done it would sometimes be necessary to use persulphate of iron or ammonio-ferric-alum in the nostril to control the hemorrhage. This patient was given up to die, but is now on the road to recovery, not having bled a drop for over five weeks, and not more than an ounce in the last three months; but the menstrual flow is entirely suppressed. This case always had a tendency to bleed if she became constipated. On May 8 she was out of doors for the first time since the 1st of December.

CASE IX.—J., aged nineteen; fair complexion; has had some menstrual difficulty for the last three months, with slight nasal bleeding the last two periods. On April 28 the regular period, began to bleed profusely from the left nostril, and it was impossible to parmanently control it until posterior plugging was resorted to on the 13th, after four or five very profuse hemorrhages that day. The posterior plug was put in position—in this instance it was made a little too hard to fit snugly without great pressure—and the anterior plug, saturated with ammonio-ferric-alum, was pressed firmly into the nostril; and tied to the posterior plug; these were allowed to remain for thirty-six hours, and after being removed the nose was douched thoroughly with very hot water, and the iodoform insufflated. An operation for dilatation of the cervix is to be performed upon this patient before the next period, with the hope that the menstrual function will be re-established at that time.

The bleeding in the last three cases has come at the time of menstrual periods, but Case VII. is the most interesting; and often I find myself wondering whether it was post-operative hemorrhage or vicarious in character. Would it have occurred had not the operation been performed? Yet, if post-operative, why should it appear so long—over ten days—after.

If vicarious, why should she have had her menses so soon—fifteen days—after their last previous appearance? Yet, if not vicarious, why should the blood have had the menstrual odor? Why should the hemorrhage have occurred

on the date the menses had been in the habit of coming? Her physicians, who were there, state most positively that it was vicarious, while many who have heard of the case, but were not present, state as positively that it was post-operative hemorrhage. One or other is in error.

In these severe hemorrhages I do not think remedies alone will have much, if any, effect, in controlling the bleeding *per se*, but believe they are necessary to correct the conditions producing them. The remedies most frequently used are bryonia, ledum, hamamelis, ergot, rhatania, melilotus, phosphorus, phosphoric acid, geranium, ferrum picrate, and kali muriaticum.

Besides the measures recommended previously, I have been informed that tannic acid and spider webs triturated together and made into a paste with glycerin, and spread over the place of bleeding, will prevent further bleeding. Another recommends the powder of the common "puff ball" spread over the point of bleeding, and if it doesn't control it use the husk of the ball. This party claims it will stop arterial bleeding from large vessels. But if any of the readers of this article have a good prescription for nasal bleeding, I will be pleased to receive it.

SECRETION OF THE PAROTID GLAND SPONTANEOUSLY DISCHARGED THROUGH THE INCISURÆ SANTORINI INTO THE EXTERNAL AUDITORY CANAL.

BY E. G. RUST, M. D., CLEVELAND, O.

A YOUNG lady of seventeen years was some months ago referred to me in regard to severe pains in the left external auditory canal. The pain could not be localized, but seemed to be continuously shifting from the region adjacent to the parotid to the mastoid, and through the intervening portion of the auditory canal.

Examinations on several successive occasions failed to reveal sufficient data upon which to base any diagnosis or to suggest any treatment. The case was therefore kept under observation. In about three weeks from the first attack, after forty-eight hours of pain, the patient consulted me. At this examination I discovered in the external auditory canal four grayish-white bodies, each about the size of two pinheads. These were removed, only to be followed, in two or three days, by similar formations, deposited after similar exacerbations of pain. The foreign formation consisted of secretions of the parotid gland which had in some way escaped from Steno's duct, and spontaneously ruptured through the incisuræ Santorini and thence through minute fistulæ into the external auditory canal. A few hours after the exudation I could remove the substance, which was then soft, like newly wetted plaster of paris ; but if the secretion was allowed to remain at its point of exit until the following day the exuded material was changed to hard, stony concretions which physically and chemically were in every way analogous to the salivary deposits which form upon the teeth. The passage of this parotid saliva, and its subsequent formation into salivary calculi, continued for six months, gradually becoming less and less, until it ceased entirely. At frequent intervals for four months following the cessation of this excretory process I examined the case, but there was never a recurrence of either the pain or the presence of any foreign substance.

ABSTRACTS FROM CURRENT LITERATURE.

Gradle, H.—A Case of Tarsitis.—*Ophthalmic Record*, March, 1898.

The report of a case of this rare disease is interesting. The symptoms were as follows: Diffuse, hard swelling of the tarsal plate of the right upper lid, with inflammatory œdema of the skin over it. The eye almost completely closed, but could be opened by the patient sufficiently for examination. Uniform injection and slight inflammatory swelling of the palpebral conjunctiva, extending over the transition folds to the eyeball. The central part of the ocular conjunctiva was normal. There was no purulent secretion.

Later the swelling became so great as to close the eye; there was a pronounced catarrhal conjunctivitis, with congestion and slight chemosis of the entire ocular conjunctiva, and a moderate diffuse haze of the lower half of the cornea. There was no pain. The case was cured by incisions of the tarsus and the use of an ointment of pyrogallic acid (1 to 10 of lanolin), on the skin of the lid; the conjunctival surface being brushed with a two per cent. solution of silver nitrate. Although the disease was due to syphilis (as is usually the case) there was no benefit from mercury and iodide of potash.

DEADY.

Wurde mann, H. V., and Black, Nelson M.—A Further Report on Halocain as a Local Anæsthetic in Ophthalmic Work.—*Ophthal. Record*, 1898.

Comparing holocaïn with cocaine, the authors report the following points in favor of holocaïn:

1st. Its action is quicker and more lasting—anæsthesia of the cornea is produced in fifteen seconds after one application of one drop of a one per cent. solution, and lasts for ten minutes and upward.

2d. It more thoroughly anæsthetizes the iris and deeper structures.

3d. It more thoroughly anæsthetizes inflamed surfaces.

4th. The anæsthesia may be indefinitely prolonged.

5th. The cornea does not desiccate under its use.

6th. It does not affect the tension.

7th. It does not act on the pupil or accommodation.

8th. It does not interfere with the nutrition of the tissues, but rather increases their blood supply and hastens healing.

9th. Its solutions are antiseptic.

10th. It is already proportionately cheaper. The writers claim that the only disadvantage of the drug is that it produces a certain amount of hyperæmia, which, however, is said to soon pass off, and that in operations there is more bleeding under holocaïn.

DEADY.

Somers, Lewis S.—Atropine Rhinitis.—*The Laryngoscope*, October, 1897.

This is a form of irritation of Schneiderian mucous membrane and turbinal cavernous tissues caused by the leakage of atropine through the lachrymal duct when used for mydriatic purposes. Like atropine conjunctivitis, it occurs only in those having idiosyncrasy for the drug. The mucosa is dry, glazed; cavernous tissue of turbinals becomes more red, but there is a total lack of secretion; as application is continued there is a sensation of heat and discomfort in nostrils; objectively turbinals are congested and secretion increased. As it paralyzes unstriped muscles it leaves a more or less permanent hypertrophy of turbinal venous sinuses, in other words, of turbinal varix. The nasal discharge is excoriating. A case of acute and another of chronic atropine rhinitis is related. In chronic condition the mucosa is gray, soggy, and macerated, and comes off in flakes. All cases were in girls between four and fourteen years. Treatment: discontinuance of drug and soothing applications.

[Acute form: acon.; chronic: merc. or pulsatilla.--ED.]

PALMER.

Deschere, Martin.—Sanicula.—*N. A. Jour. Hom.*, October, 1897.

Symptomatology caused by water from the Sanicula Spring Water of Ottawa, Ill. It contains calc. c.; alum.; borax; sil;

natr. mur.; magn.; etc. Compare with kali. c.; sulph.; graph.; squilla.; and merc. dulc. Especially adapted to children of rachitic, scrofulous, or tubercular diathesis.

NOSE.—Sore and stuffed with yellow scabs ; discharge : thin, acrid drops ; thick, yellowish green, profuse ; thick, honey-like scabs ; white so tenacious that it must be removed with fingers, stringy ; clots of black blood ; * bloody ichor ; copious yellow ; worse indoors and after eating ; sneezing and itching of nose ; soreness, tenderness, or ulceration of *alæ nasi*.

THROAT.—Ulcers with yellowish base on tonsils ; throat and posterior wall of pharynx of a purple color ; gray exudate on posterior wall of pharynx ; coughing out large clinkers in the morning that had clogged posterior nares forty-eight hours, tough like boiled cartilage streaked with blood ; fluent catarrh from posterior nares during day, dry at night ; grayish catarrhal secretions, worse in morning, after eating, must leave table to clear throat : can swallow solids better than fluids.

VOICE AND COUGH.—Complete aphonia, must speak in whispers ; deep, hollow cough, with loud rattling, caused by tickling under the sternum ; tickling cough on lying down at night, and on waking ; rattling cough, child gags and vomits a mouthful of tough, stringy matter, cough from laughing or talking, worse in warm room, in morning, better in open air.

CONCOMITANT SYMPTOMS.—Profuse sweat about back of head and neck during sleep. Catarrhal ophthalmia, photophobia. Excoriation of upper lip. Thick yellow coating on back of tongue. Craving for meat, bacon, etc., which aggravate ; thirst for small quantity often, which is vomited almost as soon as it reaches stomach ; profuse axillary sweat. Better in open air, worse in close warm room. Progressive emaciation ; child appears old, dirty, greasy brownish. PALMER.

The Treatment of Ozena by Cupric Electrolysis (Report of Committee Appointed by Society to Examine this Treatment).—Read at Belgian Soc. of Otol. and Laryn.—*Jour. Lar., Rhin. and Ot.*

At the June meeting Dr. Cheval read paper on interstitial electrolysis as treatment for ozena, obtaining cure in ninety-one per cent. Commission appointed: MM. Eeman, Schleicher, Goris, Buys, and Hennebert. Seven cases were submitted to treatment by Dr.

Cheval himself, six cases remained under treatment. "In one case the patient noticed benefit of subjective character, and declared that the crusts came away more easily." In no case did they observe any benefit or appreciable objective change.

[This is the method so strongly advocated by Scheppepegrell of New Orleans.—ED.] PALMER.

Posey, Wm. Campbell.—Metastatis Uveitis in Both Eyes,—Causing Blindness,—Resulting from an Intense Inflammation of the Nose—and Its Accessory Sinuses.—*New York Med. Jour.*, January 22, 1898.

The author presents the history of the following unique and interesting case :

"The patient, J. C., a woman, aged twenty-seven, first consulted me about a year ago, when she recited the following story : She had been engaged some four or five years previously in a large steam laundry as a mangler—her duty consisting in passing wet clothes through a drying machine. She was accustomed to remain at this machine all day long in rather confined and ill-ventilated quarters. After she had been at this work about six or eight months she began to be troubled by a sense of irritation in her nose and a tingling sensation in both hands. The nasal irritation became very marked, there was a profuse discharge from the nares, her mouth was sore, and she suffered quite severely from sore throat. The eyes were also watery and slightly injected, and after several months she noticed that her vision began to fail. The nasal symptoms finally subsided after some months, but her sight grew progressively worse, so that at the end of a year she could barely see the knob on the door. She continued at her work, however, another year, never dreaming that her occupation had anything to do with her loss of sight, although she realized that her nasal troubles had doubtless been occasioned by it ; for from the first she had noticed that acid fumes were given off from the clothes, and that the steam which arose from the water was extremely irritating to her air passages.

"At the end of two years she left the laundry, as she now was quite blind. She visited several ophthalmic clinics, where she was told that her case was hopeless—that her sight was irretrievably lost. As mention was made by one of the doctors at one of these institutions that her blindness was probably due to the action of

acids in the water, she determined to consult an attorney with a view to obtaining damages for her loss of sight.

"At the trial which was finally instituted it was brought out by the man in charge of the laundry that he was accustomed in certain parts of the process to use chlorine gas, sulphuric acid, and oxalic acid for bleaching and cleansing purposes in varying strengths. He testified that on several occasions, when hurried, the acid solutions had been so strong that the linen subjected to the action had literally crumbled away.

"She was finally non-suited on account of some legal technicality in regard to the relation between employer and employee.

"When I examined the patient, prior to the trial, she having been sent to me by her attorney for an opinion, I thought at first that her ocular condition had not been caused by acids, for I found but slight evidence of the action of the fumes upon the exposed portions of the eyes. The conjunctivæ were healthy, and the corneæ were clear, save for a small nebula in her right eye near the lower outer limbus. The globes, however, were shrunken, somewhat quadrate in appearance, and quite soft. The interior of the eyes presented a very striking appearance, showing all the signs of a previous uveitis of intense degree. The anterior chamber in each eye was filled up by the thickened and discolored iris. The pupillary edge of the iris was indrawn, and the crater-shaped pupil was filled in with a mass of organized lymph. There were new-formed vessels coursing over the irides from the limbus. On account of the absence of any appreciable signs of exterior inflammation, it was at once evident that the inflammatory material must have been carried to the eyes from within. In other words, I believe the ocular inflammation to be of an embolic nature.

"In searching for a possible source of origin for the emboli, I remembered that her first symptoms while at the laundry were those of nasal irritation; and an examination of the nose, which I at once had instituted, showed evidence of its having been subjected to previous inflammation of such severe character that I had no hesitation in imputing the ocular inflammation to that source—the more readily, as I was able to eliminate, after a searching examination, any other possible source of septic infection throughout her body. There had been no previous illness. She had never had rheumatism, and there was no indication of syphilis."

Rhinological examinations revealed the following conditions :

" Right nasal fossa : Membrane somewhat too red (probably from wind); ridges projecting at the junction of the quadrate cartilage with the perpendicular plate of the ethmoid, with the vomer, and the superior maxillary crest. Evidences of erosion.

" Left nasal fossa : Spur along junction of cartilage with the maxillary crest and irregularities of the septum. Evidences of erosion.

" The inferior turbinates present the ' grubworm ' appearance so often seen following a severe chronic hypertrophic rhinitis.

" In fact, all the findings indicate the after-effect of a hypertrophic rhinitis, she being now in the stage which some writers call the beginning of atrophic rhinitis, and which they claim follows the hypertrophic.

" Pharynx : Granular, and showing irregular meshes of vessels coursing through the membrane ; chordæ large ; mouths of Eustachian tubes prominent ; anterior pillars of the fauces injected ; tonsils irregular, but not unduly large ; vault of mouth deeply corrugated anteriorly. Many teeth gone.

" Larynx : Epiglottis somewhat anæmic ; vocal cords congested, also trachea ; tips of arytenoids do not meet by nearly half an inch, showing probably muscular insufficiency." DEADY.

Harris, Wilford.—Hemianopia with Especial Reference to Its Transient Varieties.—" Brain," Part LXXIX.

In an article on this subject the author presents the following conclusions :

1. Hemianopia rarely binasal, more commonly lateral and left-sided, with accompanying constriction of the remaining half-fields, may occur as a temporary phenomenon in hysteria.

2. Hemianopia due to a vascular lesion of the cuneus, of sudden onset, may commence with marked loss of sight, sometimes amounting to complete amaurosis, and due probably to inhibition of the remaining half-vision center.

3. The cortical half-vision centers are not subdivided into centers for light, form, and color respectively, and hemiachromatopsia may be due to a lesion anywhere in the visual path between the chiasma and the cortex.

4. Quadrantic hemianopia, though strongly suggestive of a

cortical lesion, may sometimes be due to a lesion of the internal capsule.

5. The macular region of the retina is invariably supplied with the nerve-fibers on the same plan as the rest of the retina, *i. e.*, each side of it from the corresponding side of the brain. In all cases of absolute transient hemianopia the dividing line between the seeing and the blind halves invariably passes through the fixation-point.

6. The cortical center for the macular region in each cuneus is less liable to complete destruction, and recovers earlier than the rest of the half-vision center.

7. Cases of persistent hemianopia in which the dividing line passes to one side of the fixation-point, leaving it in the second half, are to be accounted for either (*a*) by the escape or partial recovery of the cortical center for the macula, or (*b*) by the acquirement by education of a new fixation-point in the retina.

8. Hemianopic visual spectra of low elaboration, such as red or green lights, or the varieties of scintillating scotoma in migraine, are caused by discharge in the half-vision center in the cuneus.

9. Complex visual phenomena of hemianopic type, such as faces, animals, etc., are elaborated in a still higher visual center, which possibly is the angular gyrus; their occurrence in the half-field only being due to reflex irritation from a lesion generally in or near the cuneus, but which may be in the optic radiations or optic tract.

10. Double hemianopia does not necessarily cause permanent amaurosis, in many cases the return of a small area of central vision indicating the escape or recovery of the cortical center for the macula in the cuneus on each side.

11. The hemianopia in migraine is due to an epileptic discharge in the half-vision center of one side.

12. In many cases an epileptic discharge may originate in or near the half-vision center on one side, in some cases proceeding no further beyond producing temporary hemianopia, in others producing a typical epileptic fit, and again in others giving rise to unilateral convulsions without loss of consciousness.

13. Transient hemianopia in such attacks may last for twenty-four hours or longer, and may be due to vascular softening adjacent to, but not involving, the visual center or path.

14. Transient hemianopia is rare in ordinary Jacksonian

epilepsy, and is not liable to occur unless the half-vision center be (1) already slightly damaged, or (2) hypersensitive and prone to spontaneous discharge, as in migraine.

15. Such transient hemianopia not unfrequently accompanies unilateral convulsions in general paralysis, and may possibly occur in uræmia.

16. The auditory center may be similarly paralyzed through spread of the epileptic discharge. DEADY.

Macintyre, Jno. (Glasgow).—The Use of X-Rays in Diseases of the Nose and Throat.—*Jour. Lar., Rhin. and Otol.*

Description of apparatus, including (a) source of current, (b) coils, (c) condensers, (d) various interrupters, vibrators, mercury, electro-motor, mechanical, etc. (e) Crooke's tube, form of, vacuum of, shifting electrodes, cathodes; (f) stands, cryptoscopes, fluorescent screens, special screens for mouth, face, neck, and cavities of the face, etc. The parts photographed or seen on shadow on fluorescent screens were bones and cavities of face, larynx, spine, and cervical and thoracic regions, cavities of the thorax with contained viscera, heart, blood vessels, etc. Description of special apparatus devised for examining nose, larynx, etc. The pathological conditions in which the rays have been found of value are: (1) foreign bodies in antrum of Highmore, larynx, mouth, and esophagus; (2) injury, fracture of hyoid bone, superior maxillaries, etc.; (3) tumors, (a) jaw, (b) destruction of superior maxillary bone from malignant disease, (c) aneurism in chest, etc.; (4) thorax, fluid in pleural cavity, deposit in apex of lungs, etc.; (5) various conditions, *e. g.*, ossification of cartilages of larynx; anatomical specimens of internal ear, inside cranium, mastoid, etc. Then demonstrations of photographs of the above were shown.

PALMER.

Clark, B. G.—Pulsatilla; Some of Its Uses.—*The Am. Hom.*

Diphtheria, earlier stages, with high fever, severe frontal headache, involving the eyes < by moving eyes upward, great restlessness and *severe backache* "that seems as if it would break"; throat dark and purplish, with prominent veins; scraping sensation in throat and dryness and difficulty to swallow. Color

of throat reminds one of lach. or bapt.—membrane yellowish in cases in which have used it. Thirst for little and often instead of the usually considered characteristic thirstlessness. The special type of mild, tearful disposition, therefore most useful in women and children.

PALMER.

Hoover, F. Pierce.—*Acute Otitis Media Suppurativa from Swallowing a Pin.*—*New York Med. Journ.*, October 30, 1897.

The patient, an infant of two years, brought for the treatment of a discharging left ear of four days' standing. Previous to that time the child had suffered great pain in the ear for several days, which was somewhat relieved when suppuration occurred, but at night she would cry repeatedly, especially if she lay upon the affected side, and slept only in the intervals between the paroxysms of pain.

The patient was well nourished and took food regularly except when pain interfered. There was no history of previous illness and nothing unusual had ever occurred to the child, except that two months before she had swallowed a pin. The physician who was called at the time prescribed an emetic which produced excessive vomiting, and it was hoped that the pin had been expelled, although it was not found. No unpleasant symptoms followed except a sore throat, until the onset of the aural affection.

Examination revealed a very small perforation of the drumhead below the handle of the malleus from which pus was seen to ooze. The patient received the ordinary treatment for acute suppuration, but as no relief was obtained by the next day a careful examination of the throat was made, but without result. The ear was then washed out with warm water, and the author was wiping it dry with a pledget of cotton on an applicator, when he noticed that the cotton caught on something; the use of the probe detecting the presence of some object in the tympanum, chloroform was administered for purposes of exploration. The perforation in the drumhead was then enlarged with a small Graefe knife, and by means of a probe and pair of forceps a very small pin was extracted, coming out *point* first. It was of the variety used in tape or ribbon and was about one-quarter of an inch long.

The writer was of the opinion that possibly, as the result of the vomiting after an emetic, the pin passed from the throat into the eustachian tube and worked its way to the middle ear. He does not believe it was pushed from the canal into the drum, from the fact that the head was inward when it was removed. After the extraction of the foreign body the case made an uninterrupted recovery.

DEADY.

Croskey, Jno. W.—Foreign Body of Unusual Size Retained Under the Retrotarsal Fold of the Upper Lid for a Period of Eight Months.—*Ophthalmic Record*, January, 1898.

Patient presented himself complaining of a sore eye, and stated that eight months before, in Russia, while chopping wood, a fragment struck him in the eye. Later he removed from Russia to America, and while crossing Germany was subjected to a physical examination, during which his vision was tested and found to be good. On arriving in this country he still had some trouble with the eye, but not sufficient to suggest the necessity for medical aid. When he appeared at the clinic the objective symptoms were those of purulent ophthalmia. Upon examination a piece of wood 18 mm. long, 6 mm. wide, and 3 mm. thick, and weighing when dried $1\frac{1}{2}$ gr., was found in the retrotarsal fold beneath the upper lid.

The lining of the lid was covered with a thick tenacious membrane, and a mass of granular tissue, 8 mm. in length, 7 mm. in width, and 2 mm. in thickness was found at the inner canthus. The entire conjunctiva of the upper lid was somewhat granular, and the cornea was slightly hazy at the upper and inner portion. The globe was otherwise free from irritation. The piece of wood was removed; the granular tissue excised, and the use of an astringent wash soon relieved the conjunctivitis.

DEADY.

Pergens.—The Action of Colored Lights Upon the Retina.—"Brussels Society Annals," vol. vi. fasc. i., 1897.

The author has conducted a series of experiments upon dogs to ascertain the action of mono-chromatic light upon the retina, with relation to the migration of pigment and the histo-chemical changes. In résumé the results are as follows:

1. The migration of pigment is at a minimum for the red and

at a maximum for the blue. Thus it is not a physical intensity that causes this variation, since red is known to be more active than blue.

2. When a single eye is illuminated the pigment of the retina of the closed eye also migrates, varying with the character of the light.

3. The cones contract differently under diverse light stimuli, but apparently in the same degree, and there would appear to be no relation between actinic power and intensity of the waves as far as tissue reaction was concerned.

4. The quality of nuclei contained in the rods and cones diminishes under the action of the rays of the spectrum, but not in a degree corresponding with the luminosity.

This decrease is at its maximum for the red and at a minimum for the green.

5. Prolonged exposure to the action of certain rays seems to produce variations in the basic portions of the cytoplasm and nucleus, the histo-chemical changes being more marked here than in the acid or neutral portions of the cell.

6. Röntgen rays gave no reactions.

DEADY.

Clark, J. Payson.—**Complete Congenital Occlusion of the Posterior Nares.**—*Bost. Med. and Surg. Journ.*, February 24, 1898.

Objectively, was the typical "adenoid face," and inability to pass probe through nasal fossa into nasopharynx. Subjectively, was considerable dryness of mouth and throat; olfaction was totally absent, and gustatory sense dull. Occlusion was removed by drilling with a trephine. It was a bony wall varying in thickness from two to nine mm. After the operation all symptoms were relieved, almost cured, except the anosmia. PALMER.

Mackenzie, J. Noland.—**The Physiological and Pathological Relations between the Nose and the Sexual Apparatus of Man.**—*Journ. of Lar., Rhin., and Otol.*, March, 1898.

This is a most thorough article, written with the minuteness of a German, giving the history of the subject derived from Latin, Greek, and German sources. The *intimate physiological relationship* is evident from the following facts :

"I.—(a) In a certain proportion of women whose nasal organs are healthy, engorgement of nasal cavernous tissue occurs with unvarying regularity during the menstrual epoch, the swelling of the membrane subsiding with the cessation of the catamenial flow. (b) In some cases of irregular menstruation, in which the individual occasionally omits a menstrual period without external flow; and such times the nasal erectile bodies become swollen and turgid as in the periods when the external evidences of the menstruation are present. (c) The monthly turgescence of the nasal corpora cavernosa may be bilateral or confined to one side, the swelling appearing at first in one side then in the other, the alternation varying with the epoch. (d) The periodical erection may be inconsiderable and give rise to little or no inconvenience, or, on the other hand, the swollen bodies may occlude the nostril and awaken phenomena of a so-called reflex nature, such as coughing, sneezing, etc. (e) In some cases there seems to be a direct relationship between the periodical engorgement of the nasal erectile bodies and the phenomena referable to the heads that so often accompany the consummation of the menstrual act. (f) As a natural consequence of the phenomena above described, the nasal mucous membrane becomes, at such periods, more susceptible to reflex-producing impressions, and is therefore more easily influenced by mechanical, electrical, thermic, and chemical irritation. (g) The conditions (engorgement and increased irritability of the nasal mucous membrane) indicated above, together with the phenomena that accompany them, are also found during pregnancy at periods corresponding to those of the menstrual flow. There is also reason to believe that similar phenomena occur during lactation and the menopause.

"II.—The presence of vicarious nasal menstruation. (a) It is a familiar fact that women are occasionally found in whom the menstrual function is heralded or established by a discharge of blood from the nostrils. This hemorrhage, which may be accompanied by other phenomena referable to the nose, such as sneezing, etc., may be replaced afterward by the uterine flow, but sometimes continues throughout the menstrual life of the individual. (b) Epistaxis also occurs, now and then, from the suppression of the normal flux. (c) Hemorrhage from the nose may occur as the vicarious representative of menstruation during pregnancy; toward the close of menstrual life as the

premature or normal herald of the menopause; or it may be observed as a recurring phenomenon after the establishment of the change of life or after the removal of the uterus or its appendages. (*d*) These vicarious hemorrhages are, moreover, not confined to women, but make their appearance not infrequently in boys at or near the age of puberty, upon the full development of their sexual powers.

"III.—The well-known sympathy between the erectile portions of the generative tract and other erectile structures of the body.

"IV.—The occasional dependence of phenomena referable to the nose during sexual excitement (such as, for example, nose bleed, stoppage of nostrils, sneezing, and other reflex acts), either from the operation of a physiological process, the *erethism* produced by amorous contact with the opposite sex, or during the consummation of the copulative act.

"V.—The reciprocal relationship between the genital organs and the nasal apparatus is furthermore illustrated by the occasional dependence of the genito-urinary irritation upon affections of the nasal passages.

"VI.—It is, finally, quite possible that irritation and congestion of the nasal mucous membrane precede, or are the excitant of, the olfactory impression that forms the connecting link between the sense of smell and erethism of the reproductive organs exhibited in the lower animals and in those individuals whose amorous propensities are aroused by certain odors that emanate from the person of the opposite sex."

PATHOLOGICAL.

"The following data, derived from personal clinical observation, may possibly throw some light upon the subject:

"I.—In a fair proportion of women suffering from nasal affections, the disease is greatly aggravated during the menstrual epoch, or when under the influence of sexual excitement.

"II.—Cases are also met with in which congestion or inflammatory conditions of the nasal passages make their appearance only at the menstrual period, or, at least, are only sufficiently annoying at that time to call for medical attention.

"III.—Occasionally the discharge from a nasal catarrh will become offensive at the menstrual epoch, losing its disagreeable odor during the decline of the ovarian disturbance. In

many cases of ozena the fetor is much more pronounced at times, corresponding to the menstrual flow.

"IV.—Excessive indulgence in venery sometimes seems to have a tendency to initiate inflammation of the nasal mucous membrane, or to aggravate existing disease of the structure. There are those, for example, who suffer from coryza after a night's indulgence in venereal excesses, and the common catarrhal affections of the nose are undoubtedly aggravated by repeated and unnatural coition.

"V.—The same is true in regard to the habit of masturbation. The victims of this vice, in its later stages, are constantly subject to nosebleed, watery or mucous discharge from the nostrils, and perversion of the olfactory sense.

"VI.—The coexistence of uterine or ovarian disease exerts sometimes an important influence on the clinical history of nasal disease. This fact has been shown in practice in cases in which the nasal affection has stubbornly resisted all treatment, and in which it has only been relieved upon the recognition and appropriate treatment of disease of the generative apparatus.

"The most common conditions of the nasal apparatus following perverted sexual excitement, either from excessive venery or onanism, are: (1) coryza (generally of vasomotor type) with or without reflex manifestations, such as asthma, paroxysmal sneezing, etc.; (2) epistaxis; and (3) various forms of perversion of the sense of smell. In addition Peyer has observed abnormal dryness of the nasal and pharyngeal mucous membrane.

"Fleiss shows that occasionally dysmenorrhea depends upon intranasal cause, and cites cases wherein certain forms of dysmenorrhea may be temporarily dissipated by the application of cocaine to the nasal mucous membrane, or permanently controlled by cauterization."

PALMER.

Extraction of the Crystalline Lens in High Myopia. —*Medical Week.*

The following are some of the opinions expressed by European surgeons respecting this operation as the results of their experience :

Dr. Vacher.—Forty-eight cases: Favorable conditions must be insured by prolonged rest of the organ both before and after operation. In the majority of cases he does simple extraction, operating on one eye at a time.

There should be no operation below twelve diopters, nor when the other eye has been lost by detachment of the retina, nor when the vision is less than $\frac{1}{10}$. Rigorous aseptic precautions must be used and no vitreous be lost, for fear of retinal detachment.

Dr. Darier.—One hundred and forty-two cases: Sight markedly improved in eighty-five per cent., stationary in ten per cent. Eye lost in two per cent. by infective and glaucomatous complications and in three per cent. by detachment of the retina.

Dr. Vignes.—Sixteen cases: Upwards of fifteen diopters. Never met with detachment of retina, but never obtained marked improvement of vision. Performs simple extraction, removing all of the lens possible, and three days later opens the wound and removes remaining masses. Later, if necessary, extracts the capsule.

Professor Pfluger.—Extracts the crystalline masses in two or three sittings and later makes discission of capsule. Notices that the more rapid the diffusion of the masses, the better the result. Loss of vitreous to be avoided. Has observed disturbances of the vitreous as a result of the operation. In one case of detachment of the retina recovery was obtained by discission without extraction of the masses, probably by increase of the intraocular tension. Has invariably observed great improvement in vision and arrest of the progress of the myopia.

Dr. Blessig (St. Petersburg).—Of fifty cases the eye was lost in only three.

Professor Schmidt-Rimpler.—Twelve cases: Results very satisfactory.

Professor Uhthoff.—Never operates but one eye at a time. Makes discission, followed by evacuation of the crystalline masses. In aged people makes extensive incision to permit passage of nucleus. Loss of vitreous must be avoided at all costs. In hereditary myopia operation may be made from eight diopters up.

Dr. Fukala.—One hundred and sixty-two cases: Makes free crucial incision in capsule with a very thin Von Graefe knife. To remove lens uses a long narrow blade as a spatula. Has no fear of loss of vitreous, as he has had very satisfactory results after it has occurred. Operation should not be performed when vision can be improved with glasses sufficiently to enable patient to

work. Has obtained perfect emmetropia in cases varying from twelve to twenty-three diopters.

Professor Hirschberg.—Never operates for less than fifteen diopters. Loss of vitreous greatly to be dreaded. Free discission should be made and no haste should be used to evacuate the masses, as complete spontaneous may take place within two and a half months. From age of thirty years extracts with incision somewhat longer than one-third of the cornea. Completes operation by discission of capsule. DEADY.

Young, Eugene S., M. D.—Local Treatment of Painful Ulcerations by Orthoform.—*British Med. Jour.*, February 5, 1898.

This synthetic product was discovered by Professors Einhorn and Heinz of Munich, when searching for the hypothetical hidden molecule in cocaine or its derivatives which produces local anæsthesia without toxæmia. Technical name is p-methyl amido-m-oxybenzoic acid. It is a white, voluminous crystalline powder, tasteless, non-hydroscopic, melts at 120° C. Its hydrochloride is more soluble in water, but more irritating to mucous membranes. Is only slightly soluble, non-toxic, and antiseptic. Will not act on the unbroken skin. Anæsthesia commences five or ten minutes after application and lasts from a few hours to five or six days. Suppuration is usually diminished and healing accelerated. Most suitable preparations are: 1st, the *Crude powder*: Orthoform and lycopodium powder āā (insufflated accurately). 2d, *Pastilles*: ℞ Orthoform, grs. iii to v; lig. cocci., q. s.; sacch., gr. ¼; glycogelatine, q. s. 3d, *Saturated solution in collodion* (as varnish for ulcers). 4th, *Spray*: ℞ Orthoform, grs. v; sp. vini rect. and aquæ āā m l (best form for nasal and laryngeal application). 5th, *Ointment*: 10 per cent., with any good unguent. 6th, *Aqueous sol.*: 10 per cent. of the hydrochloride. Neither the powder nor hydrochloride cause sufficient anæsthesia of the unbroken mucous membrane of upper air-passages to allow of operative procedures. In the larynx it stops the reflex spasm, although a species of "gagging" ensues on touching larynx. Several cases reported of tuberculous, epitheliomatous, specific, simple, and scarlatinous ulcerations, in which attendant pain was diminished by its employment. Dose: 5 grs. of powder or painting with above collodion solution. It must be applied directly to the denuded surface and kept there for results.

Valuable in ulcer or cancer of stomach in 8 or 16 gr. doses. Also in burns, ulcerations of vulva, chronic cystitis, traumatic lesions of urethra, gonorrhea, etc. Its antiseptic action is shown by its rapidly diminishing purulent exudation. PALMER.

Thompson, Jno. A.—Anomalous Position of the Internal Carotid Artery.—*The Laryng.*, January, 1898.

Report of clinical case of hypertrophic rhinitis with secondary pharyngitis and laryngitis in female of twenty-nine years : "While examining the pharynx a distinct pulsation could be seen on the left side, immediately behind the posterior pillar of the pharynx. The pulsating artery was evidently of large size. On palpation only the ordinary pulse was felt. There was no expansion as in aneurismal pulsation. Examination externally showed the internal carotid absent from its normal position on the left side. There was no history of pain in the throat, nor were there any symptoms that would suggest aneurism. . . . The course of the artery in the pharynx was very superficial, apparently lying beneath the mucous membrane." PALMER.

Taylor, Charles Bell.—Notes on a Case of Apparently Incurable Blindness in which Sight Was Restored.—*London Lancet*, September 11, 1897.

The author gives the following history of a case which is of more than common interest:

"On admission I found both pupils contracted, adherent to the capsule of the lens, and blocked by dense calcareous masses, while the eyes themselves were so shrunk and soft that minus three, according to Sir W. Bowman's formula, was barely sufficient to express their condition. I concluded that the opacity and calcareous degeneration of the lens—cataracta complicata accreta—was a secondary phenomenon ; that sight was probably lost before the pupils were blocked ; that there had been impairment of the circulation in the vessels of the uveal tract, liquefaction of the vitreous, and possibly also detachment of the retina in both eyes—a diagnosis which was to some extent borne out by notes of the case which were kindly sent to me by Mr. Bickerton of Liverpool, from which it appeared that she had originally suffered from cyclitis preceded by choroidal changes and complicated with facial paralysis. She had been for some time an in-

patient in the ophthalmic wards of a general hospital before coming under Mr. Bickerton's notice, and was subsequently seen and prescribed for by other specialists. I treated her with constitutional remedies *secundum artem*, with the constant galvanic current, and sub-conjunctival injections, and, when the improved condition of the eyeballs and increased perception of light seemed to warrant the procedure, extracted both lenses with the capsule entire and without iridectomy. The operation—despite extensive adhesions and so many contra-indications and drawbacks—was perfectly successful, and she was very soon able to go about the crowded streets—even after nightfall and in the winter months—unaccompanied, to read the signs over the shop windows, and to enjoy a degree of freedom which was highly appreciated after having been led about for years. A continuance of the treatment, after recovery from the operation, was followed by daily improvement, until the death of a relative compelled her to return home, since which time I have had letters from her as well written as any I am in the habit of receiving." DEADY.

Baird, T. M.—Severe Epistaxis.—*Jour. Am. Med. Assoc.*

A clinical case in which anterior and posterior plugging supplemented by simultaneous application of Monsell's solution, antipyrine, and other styptics were unsuccessful. After removal of all dressing, new plugs, thoroughly saturated with liquid alboline, were introduced anteriorly and posteriorly with complete checking of hemorrhage. Importance of procedure lies in the saturation of the cotton with alboline, liquid vaseline, or any light oil to prevent blood oozing through the ampion. [I have successfully applied this principle by packing nares with long strips of iodoform gauze thoroughly saturated with benzoinol.—ED.]

PALMER.

Bishop, S. S.—Clinical Tests of New Remedies.—*The Laryngoscope*, January, 1898.

After testing nosophen in chronic, simple, and syphilitic ulcerations in the nose, throat, and ear, in cases in which other medicaments as iodol, hydrozone, iodoform, alcohol in saturated solution, etc., had failed, he decides it is a good substitute for our mainstay,—iodoform,—being better than the latter because there are no toxic symptoms therefrom. When spraying nares

with solution of nosophen the return fluid appears like blood—but does not stain, being washed out easily. PALMER.

Chiari, O.—Paralysis of Both Recurrent Laryngeal Nerves.—*Wien. klin. Wochen.*, February 3, 1898.

REPORT OF A CLINICAL CASE.—Female. Aged forty-six years. More or less dysphagia for ten years. At first the left chorda vocale was in cadaveric position; esophagus stinosed, only allowing passage of smallest sound; and by means of radioscopy a pulsating tumor was discovered just left of manubrium sterni. She gradually became worse, a small tumor appearing in the left sinus pyriformis, the right chorda vocale took the cadaveric position about two months previous to death, when complete aphonia supervened. Ultimately, it being impossible to swallow, gastrotomy was performed, but death ensued. Necropsy: In the lower portion of the larynx, implicating the esophagus, was a tumor which had caused complete degeneration of the recurrent laryngeal nerves. The crico-thyroid muscles were not paralyzed, demonstrating that these nerves do *not* supply them.

PALMER.

Bottome, Tr. A.—Congestion at the Base of the Tongue.—*The Laryngoscope*, January, 1898.

After speaking of what Bosworth and Lenox Browne say regarding varicosities on the base of tongue and hypertrophy of the lingual tonsil, he reports that he has had at least ten patients complaining of the following symptoms, in which there was no abnormality of the tissues from the tip of nose to the trachea, which is usually considered to cause them. Furthermore, the removal of this condition resulted in disappearance of the symptoms. The symptoms were "a tickling or irritation in the throat which produces a frequent dry, irritating cough, and, in the case of singers and public speakers, a tendency to rapid tiring of the voice and hoarseness. Half of the cases followed attacks of bronchitis. Four cases occurred in school teachers and two in clergymen; in each the condition dated from some particular excessive use of the voice or use of same under trying circumstances. The treatment employed was either frequent application of fifty per cent. aqueous solution of nitrate of silver, or one or two applications of flat galvano-electrode over area of congestion (this should be done rapidly and slightly).

PALMER.

BOOK REVIEWS.

A TEXT-BOOK OF SPECIAL PATHOLOGICAL ANATOMY. By ERNST ZIEGLER, Professor of Pathology in the University of Freiburg. Translated and edited from the eighth German edition by Donald MacAllister, M. A., M. D., and Henry W. Cattell, M. A., M. D. Sections IX.-XV. Pp. 579-1221. Price \$4.00. New York: The Macmillan Company, 66 Fifth Avenue. 1897.

The translators of the present edition are to be congratulated on the ability with which they have concealed the German origin of this most excellent work. One would suppose that it had been written, instead of translated, by natives of the British Empire. This, the second volume, completes the English edition, and is arranged as follows:

Section IX., the Alimentary Tract; X., the Liver and Pancreas; XI., the Respiratory System; XII., the Urinary Organs; XIII., the Genital System; XIV., the Eye; XV., the Ear. Index, i-xxxi.

The text is profusely illustrated, there being no less than 253 plates, many of them in colors, and with very few exceptions they are of a high standard of artistic excellence.

It would be a work of supererogation to commend a treatise which is an acknowledged authority on its subject; and we must be content to note the fact that the present edition has been brought up to date, as is evidenced by numerous references to publications which have appeared during the past two or three years.

While this is true of the body of the work, so much can hardly be said of the part on the eye by Professor Haab, who apparently leans to the old obstruction theory in the ætiology of choked disk, and whose bibliography is most of it rather ancient. Still, it is ungracious to criticise small matters where the general average is so excellent.

The volume is handsomely gotten up, and the now completed work will be a great addition to our literature on this subject.

A HANDBOOK OF THE DISEASES OF THE EYE AND THEIR TREATMENT. By HENRY R. SWANZY, A. M., M. B., F. R. C. S. I. Sixth edition, with illustrations. Pp. 629. Price \$3.00. Philadelphia: P. Blakiston, Son & Co. 1897.

This is one of the most compact and readable of our works on this subject, and for its size one of the best. That these facts have been appreciated is evident from the constant demand for it, the fifth edition, issued in 1895, having been for some time out of print.

The present volume has been revised carefully and brought up to date generally, but in two particulars much new matter has been inserted. In Chapter XVII., on ocular diseases and symptoms liable to accompany diseases of the brain and spinal cord with an account of the functional derangements of vision, these subjects have been treated in a most excellent manner and at greater length than is usually the case in works of this character.

Chapter XIX., on the orbit, contains an account of orbital tumors which, though concisely written, furnishes quite as much actual information as any of our general text-books on the eye, and much more than some of them. In our opinion, one of the best things in this, or any other book of its class, is the article on "The Pupil in Health and Disease," but this is a matter of general knowledge, as it has appeared in previous editions.

To make room for the new material, the chapter on elementary optics of former editions has been dropped, and in our opinion the value of the work has been enhanced by the change.

The type is very clear and easily read, the paper and binding excellent.

ANNUAL AND ANALYTICAL CYCLOPEDIA OF PRACTICAL MEDICINE. By CHAS. E. DE M. SAJOUS, M. D., and one hundred associate editors, assisted by corresponding editors, collaborators, and correspondents. Illustrated with chromo-lithographs, engravings, and maps. Vol. I. Philadelphia, New York, Chicago: The F. A. Davis Co., publishers. 1898.

This work is magnificent in conception, and, if we may judge from the first volume, now before us, it will be equally so in execution. Certainly no practitioner who understands its value will be able to dispense with it.

It is an outgrowth of Sajous' Annual, so long and favorably known by progressive physicians, in which the author has en-

deavored to combine the material usually found in a text-book with the latest additions to medical knowledge constantly presented in periodical literature, the whole being alphabetically arranged in encyclopedic form.

In the words of the prospectus, "the new publication has the alphabetical arrangement, and comprises a concise statement of the generally accepted methods in vogue in one style of type, while in a different type, on the same page, can be found the opinions of well-known authorities bearing upon whatever may be debatable regarding the subject in hand. This alphabetical arrangement will consider all the practical subjects of medicine and surgery and the clinical application of therapeutics. It will appear at the rate of one volume each six months, the whole alphabet being covered in three years ; and during this time a monthly supplement, alphabetical from A to Z, will be brought out ; so that a doctor can have a complete synopsis of the latest journal literature to reinforce his system of reference."

It will thus be seen that the aim of Dr. Sajous and his editorial staff is designed to accomplish two things : 1st. To give a satisfactory statement of what may be safely relied upon as the best general method of treatment in any given case. 2d. To combine with this a means of practically utilizing the discussion by the leading medical authorities of the world, which may in any degree modify present established methods.

It will be evident that this undertaking is a step in advance of anything heretofore presented by medical publishers.

Vol. I. covers the field from abdominal injuries to Bright's disease, inclusive; and it must be understood that not only diseases are presented, with their ætiology, pathology, symptoms, treatment; and, where operation is admissible, the surgical technique ; but remedies of all kinds are taken up, their origin described, methods of preparation, physiological action, symptoms of poisoning, with treatment of the same, and therapeutic uses given ; the text throughout being interspersed with abstracts from prominent articles on the subject under consideration from the most recent literature, with the result that the reader has at his command practically all that is known of a given subject, up to date.

Among the many subjects considered in this volume are acromegaly ; Addison's disease ; albuminuria, both physiological and pathological, with its relation to life insurance and the various

tests by which its presence is ascertained ; aneurism, with all methods of treatment, medical and surgical ; animal extracts, including a table of published cases of cretinism treated by their administration, their methods of preparation, and a résumé of the various diseases to which they are applicable—aphasia, appendicitis, beri beri, etc.

The volume is printed on heavy paper of excellent quality, the text being interspersed by numerous plates, many of which are in colors, and most of which are beautifully executed. It is strongly and handsomely bound, and is altogether one of the finest specimens of bookmaking that we have seen for many a day. We most unreservedly commend it to our readers.

THE INTERNATIONAL MEDICAL ANNUAL AND PRACTITIONERS' INDEX. A work of reference for medical practitioners. Sixteenth year. E. B. Treat & Co. 1898.

Again we welcome to our library the yearly *multum in parvum* of our medical literature. It is much similar to its valued predecessors, unless it be a little more terse and pithy. Time does not permit a general perusal of the book before this needs to be forwarded ; but in our own special lines we find the following interesting topics considered :

The Ear.—As introduction it gives some of the more common manipulations for diagnosis and treatment, which are of interest to the general practitioner ; and follows with a concise résumé of treatment more recently added to our armamentarium—*e. g.*, for keloid of the lobule ; hematoma auris ; acute and chronic myringitis ; deafness due to residua of suppuration in the middle ear ; galvanic dilatation of the eustachian tube for chronic dry catarrh, etc., etc.

The article on the *Eye* considers formalin as a solution for the mounting of specimens and as a remedial agent. Eucain, holocaïn, and scopolamin. The use of X-Rays in surgery of the eye, and Hotz' new operation for ectropion.

Larynx.—Hemorrhagic laryngitis ; ictus or laryngeal vertigo ; and the later additions to the treatment of tuberculosis laryngis.

Nares.—Disease of lachrymal duct due to nasal disease ; nasal reflexes—(a) asthmopia, (b) loss of vision, (c) cough, (d) paroxysmal sneezing, and (e) spasmodic dyspnœa ; and, finally, reports a stubborn case of phagedenic ulceration which withstood

all the more modern modes of treatment and was only arrested by the antiquated Zittmann's hot-air treatment. In the treatment of some old rounder that may fall to our lot this in itself may be worth the book.

At the end of the article on each and every subject is a list of the most interesting papers written upon such subject the previous year.

Messrs. Lea Brothers & Co. announce for early publication the following books by eminent authorities :

A MANUAL OF OTOTOLOGY. By GORHAM BACON, A. M., M. D., Professor of Otology in University Medical College, New York. With an Introductory Chapter by CLARENCE J. BLAKE, M. D., Professor of Otology in the Harvard Medical School, Boston, Mass. In one handsome 12mo volume, with numerous illustrations.

THE TREATMENT OF SURGICAL PATIENTS BEFORE AND AFTER OPERATION. By SAMUEL M. BRICKNER, M. D., Visiting Surgeon at the Mt. Sinai Hospital, New York. In one handsome volume of about 400 pages, with illustrations.

DISEASES OF THE NOSE, THROAT, NASOPHARYNX, AND TRACHEA : A Manual for Students and Practitioners. By CORNELIUS G. COAKLEY, M. D., Professor of Laryngology in University Medical College, New York. In one volume, 12mo, of about 400 pages, with numerous illustrations, many of which are in colors.

A TEXT-BOOK OF ANATOMY. By American Authors. Edited by FREDERIC HENRY GERRISH, M. D., Professor of Anatomy in the Medical School of Maine. In one handsome imperial octavo volume, copiously illustrated in colors.

ITEM.

—The annual meeting of the American Ophthalmological, Otological, and Laryngological Society will convene at Chicago, June 22. From the number of papers presented and the subjects they cover, a most successful meeting is assured. The session will close in time for the members to proceed to Omaha to attend the Institute meeting.

THE JOURNAL OF OPHTHALMOLOGY, OTOLOGY AND LARYNGOLOGY.

EDITOR.

CHARLES DEADY, M. D.

ASSOCIATE EDITOR,

A. W. PALMER, M. D.

THE DIFFERENTIAL DIAGNOSIS OF ULCERATIVE DISEASES OF THE PHARYNX AND LARYNX.

BY S. S. KEHR, M. D., DENVER, COL.

DISEASES of the upper respiratory tract that are attended with ulceration and loss of tissue are productive of serious and often fatal results. At the onset they present many similar manifestations. Should the disease begin in the pharynx, the initial symptom will be pain or soreness of the throat and interference with deglutition. Should it begin in the larynx, pain will again be the first symptom, and interference with the voice—consequently hoarseness.

Inspection in the early stage reveals a localized hyperæmia and tumefaction. It is necessary for the examiner to remember that the antecedent or family history may aid in the diagnosis of the diseased process.

It is seldom that cases present themselves in the early stages. In many the diagnosis is almost impossible until the case has been under observation for a time, and the character of the process, the rapidity of its breaking down, the tendency to ulceration, or other features have been carefully noted.

If the patient acknowledges having had a venereal ulcer, we must be on our guard not to give it undue

weight and conclude that the case under consideration is necessarily syphilitic.

Let us consider briefly the clinical picture presented in each of the various diseases attended with ulceration, and then place side by side individual and characteristic symptoms of the four ulcerative conditions to be presented :

Syphilis.—The second stage of syphilis is the most common of the ulcerative diseases of the organs under consideration. It is well known that this form is peculiarly prone to attack mucous membrane, and the pharynx and larynx offer no exception to the rule. The lesion manifests itself as patches of erythema or mucous patches, or there may be only a diffuse redness. An early symptom is a great dryness and a sense of heat in the parts affected.

Erythematous patches that are symmetrical are strongly characteristic. We are not concerned with superficial isolated patches, which are very common and present few diagnostic difficulties.

The ulcers may be divided into the superficial, and deep or gummatous. The ulcer may begin as a dark-brown patch of the mucosa or as a gummata.

The posterior lateral walls of the pharynx are the most common sites for the superficial ulceration, which spreads very rapidly to the soft palate and uvula, or it may begin on the soft palate and spread toward the lateral walls. The tonsils are frequently the site of the affection. The superficial is clean-cut and edges even with the surrounding membrane. The floor is covered with a grayish mucus. The areola is always inflamed.

The gummy tumor is regarded by all authorities as the precursor of the deep ulcers of syphilis. It appears in the pharynx and larynx as a reddish mass, which shades into a fainter hyperæmia of the surrounding tissues, soon turning grayish in the center and becoming slightly elevated above the surrounding tissue. The edges are clean-cut, borders indurated, discharging yellowish mucus; the bed of the ulcer is hard to the touch.

Frequently these gummy tumors make their appearance

very rapidly. Cases are on record in which the appearance of the mass, the breaking down of the same, and the destruction of a large portion of the soft palate have occurred in two weeks. It may begin as several small ulcers close to one another, but quickly uniting to form one large roundish or oval ulcer.

The gummy tumors, and the ulceration succeeding them, show little tendency to invade other tissues than those originally involved. Ulcers of the pharynx rarely extend to the naso-pharynx and never to the larynx. Ulcers of the larynx never extend to the pharynx. We may have involvement of the different portions of the respiratory tract, either the larynx, pharynx, or nares. This is an important diagnostic feature, totally unlike carcinoma, with which syphilis is likely to be confounded.

The ulcer may be so large as to involve the entire posterior wall of the pharynx, the soft palate, and uvula.

There is no disease where the destruction of tissue is so rapid and the resulting cicatrix so disfiguring as in syphilis. These cicatrices constitute a material aid in diagnosis. In the pharynx they are often very annoying and interfere with its proper function, but are seldom inimical to life. In the laryngeal cavity the cicatrization and contractions may be so great as to encroach seriously upon the lumen, necessitating tracheotomy; or bands may form, stretching across the cavity, demanding division or tracheotomy. When the epiglottis is attacked the ulcers generally occur on the free edge.

The gummy tumors appear in the larynx as a reddish mass, and are situated in any portion of the larynx—the posterior wall, arytenoids, or false or true cords; when showing on the vocal cords, they usually appear only on one side. Among the first symptoms are hoarseness, sometimes complete aphonia; and later there may be dyspnoea, caused by the growth encroaching upon the lumen of the cavity. Frequently there is a cough which is of a peculiarly harsh and smothered character.

The gummatous ulcer is apt to break down rapidly into

the syphilitic ulcer, but may persist for a long time as a gummatous ulcer. Pain is usually not severe until ulceration begins.

There is a great tendency to necrosis of the cartilages and bones of these parts.

Tuberculosis.—This is next most frequent in occurrence of the ulceration attacking the pharynx and larynx.

Tuberculosis of the pharynx is extremely rare, and very seldom primary, being usually secondary to tubercular changes in the lungs or larynx. The early symptoms of pharyngeal tuberculosis are very much the same as those of syphilis or any ulcerative condition, viz.: soreness of throat and painful deglutition, in addition to which there is a burning and smarting. In syphilis and carcinoma, however, these symptoms occur in a previously healthy and often robust individual; not so in tuberculosis: here the patient has been previously weakened by the existing disease of the lungs or larynx, and consequently is pale and anæmic, with elevation of temperature, except in primary pharyngeal tuberculosis, which is so rare that it is hardly worth while to consider it.

One of the earliest manifestations is an anæmic condition of the mucous membrane; in other cases it may be of general hyperæmia of the membrane. Frequently the mucous membrane is covered with a thick, tenacious, and ropy mucus; later it shows itself in a grayish, shallow, cuticular ulceration, or in granulations distributed over the pharynx, faucial region, and palate, or in a deposit of miliary tubercles; two or three of these may coalesce, forming one good-sized ulcer. The ulcer is not raised above the surrounding tissues, and does not present a punched or deep appearance. The edges are not clean-cut, but gradually shade into the surrounding tissues. There is no induration or areola. In tuberculosis of the throat the cervical vertebræ are usually prominent. Frequently there is tremulousness of the soft palate and uvula and a very spacious pharynx.

The voice tires on exertion, and is frequently hoarse;

the cough is of a paroxysmal character, with little or no expectoration.

Laryngeal tuberculosis in the primary form is very rare, but much more common than the primary form of pharyngeal. The first changes in the larynx are an unnatural paleness and tumefaction of the epiglottis, which often presents ragged edges, ulceration of its posterior surface, and pyriform swellings of the arytenoid cartilages. The swelling has an appearance of infiltration, and is often so pronounced as to hide the inter-arytenoid ulceration from view. The tendency is for numerous small ulcers to form, and near them are small yellowish or grayish nodules, which finally break down and form fresh ulcers.

Acute or miliary tuberculosis is often so very rapid in its course as to result fatally in a few weeks; the areas of the miliary tubercles bleed easily by pressing upon them.

The ulcer in the secondary form of tuberculosis is usually of slow development and may not appear until months after the throat is affected. It extends slowly, and is more shallow than the ulcer of syphilis. The edges are irregular. There is a thick, agglutinated mucus. Hoarseness is always present, which may go on to entire loss of voice. Pain is always marked from the first, frequently extending into the ears, especially when the ulceration involves the base of the epiglottis. Pain is excruciating on swallowing if the posterior part of the larynx is involved.

Swallowing of liquids may cause severe paroxysms of coughing and the liquid to be expelled from the nostrils. The epiglottis becomes thickened, assuming a turban shape, and frequently the uvula is club-shaped.

Constitutional symptoms appear early in the disease, with increased pulse, elevation of temperature,—especially toward evening,—night sweats, and loss of weight.

The microscope is invaluable in the diagnosis in tuberculosis of the pharynx and larynx.

Carcinoma is next in point of frequency of the ulcerative conditions of the organs under consideration. This form

of ulceration is rarely found. The majority of cases occur between the ages of fifty and seventy.

Hoarseness is generally the first symptom, and may continue for a year with no other symptom of cancer present. The pain is of the same character as in carcinoma of other portions of the body—constant, lancinating, and often intolerable. It is first complained of during deglutition, soon becoming constant and often almost unendurable. The cervical glands become enlarged and painful. The angle of the jaw is stiff; opening the mouth is difficult; as in other ulcerative conditions of the throat, pain is referred to the ear on the affected side: thus the ever-present pain in the ear is often the chief complaint, occurring very early in the course of the disease. Cases are recorded where the ear received treatment for some time before the true nature of the affection was discovered.

The cancer may extend from the tongue, or have its starting point in the tonsils, the border of the soft palate, epiglottis, the inter-arytenoid fold, or on the posterior part of the vocal cords, and in the order enumerated as to frequency. The progress is often exceedingly rapid, so that, unless a case is seen early, all the tissues above enumerated may be involved and a serious difficulty arise as to the original site.

The cancer may commence locally as a circumscribed congestion, a diffused tumefaction, or as a hard circumscribed tumor. The ulcer is usually single, with a reddish or whitish surface, and frequently has nodular excrescences around it.

The scirrhus variety is more often found in the pharynx and epithelioma in the larynx.

Diagnosis of cancer of the larynx in the early stages is extremely difficult, on account of its similarity to other forms of ulcerative diseases.

The progress of the disease is not nearly so rapid as the pharyngeal form of cancer. The first symptoms are pain and hoarseness; the pain is sharp, persistent, and lanci-

nating in character, and, as in cancer of the pharynx, is frequently referred to one or the other ear.

The cervical glands are rarely involved in cancer of the larynx.

The odor attending a case of malignant disease of the larynx is peculiarly disgusting; but let us not forget the disgusting and penetrating odor of syphilitic diseases of the larynx.

Here, as is in the pharynx, the ulcer is characteristic. The tumor is accompanied by ulceration, but differs from other forms of ulceration in which the first stage has passed, and infiltrated cells, broken down, by there being a loss of normal tissue; the ulcer is clear-cut and distinct, with œdema of the surrounding tissues; dyspnœa and ulceration, with hemorrhage, may occur in the early stage.

Cancerous cachexia and loss of flesh are usually marked. The microscope will be of marked benefit in the diagnosis.

Lupus is the least common of the ulcerative conditions to be considered.

This affection is exceedingly rare in the pharynx and larynx, and is usually found in connection with lupus of the skin of the face, or may be complicated with lupus of the nose; this constitutes an important feature in the diagnosis.

Lupus is very insidious in appearance, and is chronic in nature, usually appearing first on the tonsils and soft palate, either as an infiltration of cells and thickening of the tissues, later a slow breaking down or rather absorption, or, as confluent, hard, dark-red nodes on the normal or pale mucous membrane; or superficial, perforating ulcers, with hard everted edges and excavated base, may appear in place of the nodes. During the progress of the disease, nature is making an effort to heal over the parts affected; therefore there are numerous unsightly and distorted cicatrices, giving the parts a lumpy and distorted appearance. In consequence of the peculiar ulcerative process, there is no discharge of pus.

Deglutition and phonation are interfered with in proportion to the amount and locality of tissue involved. The discomfort is greater than the pain. The appearance of lupus is similar to syphilis, from which it may be distinguished by the history, its slow progress, nodular appearance, and less-marked areola. Lupus is distinguished from tuberculosis in that the mucous membrane is not so pale, while the ulceration of lupus is greater and surrounded by a slight areola.

The first symptoms of lupus of the larynx are interference with the proper functions. There is a hoarseness or entire aphonia; later a local sensation of rawness and scraping, and as the disease progresses the symptoms become more marked. If the ulceration be great, the epiglottis may be destroyed, resulting in difficult deglutition; seldom any pain during deglutition or phonation.

In the main the symptoms of each are so distinctive as to make the diagnosis comparatively easy. The two diseases most frequently confused are syphilis and tuberculosis. The diagnosis of cancer is often difficult in the early stages. The history, appearance, and course of lupus are so essentially different from the other forms of ulceration of the pharynx and larynx as to make it almost distinct from the others in the group. The microscope will aid us in the diagnosis of cases where we are in doubt as to the condition.

Grouping the symptoms in parallel columns, we find:

ULCERATION OF PHARYNX.

SYPHILIS.	CARCINOMA.	TUBERCULOSIS.	LUPUS.
Ulceration appears very early in the disease, about the second week. Ulcers clear-cut and punched out. Destruction of tissue great.	Ulceration appears at the end of the second month after the appearance of the growth; ulcer not clear-cut. The normal tissue is replaced by the morbid growth.	Ulceration appears very early. Ulcers shallow and not clear-cut, shading into the normal tissue.	Ulceration rare, often presumed to be absorption of tissue.
A profuse, purulent discharge and necrosed tissue covers the surface of the ulcer.	Very little discharge covers the growth; a thin sanious discharge covers the ulceration.	A muco-purulent secretion and agglutinated mucus covers the surface of the ulcer.	Little or no secretion.
The borders of the ulcer are indurated and hyperæmic.	The growth is of stony hardness and is surrounded by an areola; no induration until the parts are encroached upon by the growth.	No areola or induration.	Consists of a series of indurated nodules.
The destruction of tissue is rapid and deep.	The destruction is quite rapid, and extends in all directions.	The destruction is slow and superficial.	The destruction is exceedingly slow in its course.
The ulcer confines itself to the pharynx, rarely extends to naso-pharynx, and never to the larynx.	The ulcer has no anatomical bounds; it extends in all directions and attacks all tissues.	The ulcer confines itself to the mucous membrane of the pharynx, extends laterally.	The ulcer may extend to the larynx.
Necrosis of cartilage.	No necrosis.	Necrosis of cartilage.	Necrosis is rare.
New ulceration upon points which have cicatrized, rare.	No ulceration upon points which have cicatrized.	New ulceration upon points which have cicatrized, rare.	Frequent, new ulceration starting upon points which have cicatrized.
Pain usually slight.	Pain constant, lancinating; many times referred to the ear.	Pain severe on deglutition, referred to ear.	Pain slight, if any.
General health unimpaired.	Early in the disease the condition is good; later, the health falls rapidly.	The general condition is poor from the first inception of the disease, indicating some grave constitutional disease.	The general condition is impaired very slowly.
Frequent evidence of specific disease in other organs.	No evidence of previous disease.	Pulmonary and laryngeal manifestations.	Cutaneous manifestations previous to, and concomitant with, the pharyngeal involvement.
No fever.	No fever.	High fever.	No fever.
Sputum contains uncharacteristic morbid products.	The examination of the sputum is negative.	In the sputum are found tubercle bacilli.	Examination of the sputum is negative.
Microscopic examination of excised piece of diseased tissue reveals large numbers of small round cells.	Microscopic examination of excised diseased tissue shows the characteristic cells of the various forms of carcinoma.	Microscopic examination of excised diseased tissue shows the giant cell, tubercle bacilli, and other evidence of tuberculosis.	Microscopic examination of excised diseased tissue is similar to that of tuberculosis.

ULCERATION OF THE LARYNX.

SYPHILIS.	CARCINOMA.	TUBERCULOSIS.	LUPUS.
Pain slight.	Pain constant, lancinating.	Pain quite severe on deglutition.	No pain.
Ulceration spreads rapidly, and may attack any portion of the larynx.	Ulcerates more slowly, and may attack any portion of the larynx.	Ulcerates slowly and usually attacks the inter-arytenoid space or arytenoid cartilage.	Ulcerates very slowly, and may involve any portion of the larynx.
The first evidence is a clear-cut, deep ulcer.	The first evidence is that of a new growth in the laryngeal cavity; the ulcer is not clear-cut.	Usually the first evidence is small spots of induration which may be followed by œdema.	The first evidence is a nodular mass.
Very little œdema, with slight induration around the ulcer.	The laryngeal cavity is encroached upon by the growth.	The arytenoids are very much swollen.	Little or no swelling.
The cartilage is frequently involved by the ulcer.	All the tissues may become involved by the growth.	The ulcer is not deep, but extends laterally.	Ulcer very rare.
Muco-purulent secretion and necrosed tissue covers the ulcer.	A discharge covers the growth.	A thick muco-purulent discharge covers the surface of the ulcer.	No discharge.
Cicatrices are often present.	No cicatrices.	No cicatrices.	Cicatrices numerous.
No fever.	No fever.	High fever.	No fever.
Hyperæmia and injection of mucous membrane.	Hyperæmia of the mucous membrane.	Paleness of the mucous membrane.	Injection of the mucous membrane.
Cicatrization produces laryngeal stenosis.	Tumors produce laryngeal stenosis.	Tubercles may produce laryngeal stenosis.	Laryngeal stenosis seldom.
Usually evidence of syphilis in other tissues.	In primary laryngeal carcinoma, no other involvement until later in the disease.	Usually secondary to other pulmonary trouble.	Usually coincident to cutaneous manifestations.
General health unimpaired.	No impairment in the early part of the disease; later, marked involvement.	Previous to the laryngeal involvement the general health is impaired.	No impairment of the general health.

SOME RELATIONS OF THE EYES TO DISEASES OF THE BRAIN.

BY D. A. MacLACHLAN, M. D., DETROIT, MICH.

THE relations between the eye and the whole nervous system are very intimate, but those between the eye and the brain are particularly close. Brain lesions produce many disorders of the eye, but it is rare to find the latter producing the former.

When we recall the almost immediate connection of the eye with the brain through its nerves, blood vessels, and lymphatics, and the prolongation of the cerebral meninges into the sheath of the optic nerve, and indirectly into the coverings of the eye, we can understand how nearly impossible it is for profound brain lesions to exist or progress without extending to the eye.

The eye disorders thus set up are either functional or organic. They may be subjective only, or objective, as in inflammation or atrophy of the optic nerve, spasm or paralysis of the ocular muscles, etc. Functional disturbances of the eye due to central nervous disorders are often helpful and sometimes indispensable in localizing the brain lesion, while objective changes in the optic nerve, retina, etc., tell us more of the character than of the location of the brain disease.

The eye has three kinds of nerves—the visual, motor, and sensory. The optic or visual nerve possesses two kinds of fibers, *i. e.*, finer and coarser ones—both about equal in numbers (about 500,000, according to Foster). The finer conduct stimuli centripetally, the coarser centrifugally.

The finer are axis cylinder processes of the ganglion cells of the retina; the coarser are derived chiefly from the anterior corpora quadrigemina.

The *motor nerves* of the eye, except the sympathetic, lead to nuclei in the neighborhood of the aqueduct of Sylvius and the floor of the fourth ventricle. The motor sympathetic fibers are derived from the superior cervical ganglion.

The *sensory nerves* of the eye come from the first and second branches of the trigeminus (fifth), the latter supplying only the lower lid.

Nervous diseases of the eye may be divided into three classes: peripheral, intermediate, and central. *Peripheral* diseases are located in the eye, the optic nerve, the chiasm, and tractus; *intermediate*, in the primary optic ganglia, viz., the anterior corpora quadrigemina, the pulvinar (posterior portion) of the optic thalamus, and the external geniculate body; *central* or cortical disorders are located in the cortex of the occipital lobe.

Peripheral disorders include color disturbances, retinal asthenopia and hyperæsthesia; day-blindness and night-blindness; affections of the optic nerve (atrophy, etc.); disorders of the chiasm, such as tumors, syphilitic and tubercular lesions, and diseases of the optic tract.

In all peripheral visual disorders there is no light reaction of the pupils when the light falls upon insensitive or blind portions of the retina, while there is when it falls on sensitive parts. Hence absolute rigidity of pupils means loss of function of the entire optic tract (homonymous hemianopsia).

Lesions of the primary optic ganglia are not often recognized positively; but from the fact that the visual fibers here enter into relation with other systems for the first time, they must frequently exist. These ganglia are believed to be the center for associated movements of the eyes, and their function to convey the knowledge of involuntary ocular movements due to light stimuli to the occipital cortex, where they are directed or inhibited. If the pupils are

affected in diseases of this tract, it appears to be because the fibers to the nucleus of the sphincter of the iris pass very close to it. Among other functions, the primary optic ganglia convey involuntary reflexes from the eye, not only to the ocular muscles, but also to those of the head, the neck, and the entire muscular system. For instance, if the back of the left hand is irritated, the muscles of the neck turn the head in that direction, and the ocular muscles focus the eye upon the hand. So, too, if the conjunctiva is violently irritated, spasm or reflex closure of the eyelids takes place, and in addition reflex movements of the arm and hand toward the eye, as rubbing it, etc. Or, if a bright light be suddenly flashed upon the retina, not only are the head and eyes turned in that direction, but all the muscles of the body respond by sudden starting, crying out, running away, etc. To be sure, these may be partially inhibited by the higher centers, but will be arrested much or little, in proportion as the light stimulus has been mild or severe. So great is the responsiveness of muscles to stimuli passing through this tract, that the movements often appear to be really intentional or voluntary. Disease of this tract affects vision, and, in a similar degree, involuntary movements of the eye, face, and other parts of the body.

Central or cortical disorders of vision are homonymous; they show no changes under the ophthalmoscope, and the involuntary reflex movements caused normally by light stimuli still remain intact. Diseases of the occipital cortex, such as embolism, tumors, etc., produce loss of vision, color disturbances, disturbed movements of the eyes, hallucinations, etc. The ophthalmoscope reveals no changes, because the ganglion cells which are destroyed in the primary optic centers do not send axis cylinders into the optic nerves. The movements of the pupils to light and other reflexes remain intact, notwithstanding the absence of all perception of light. Reflexes of parts other than the pupils are observed with more difficulty, but cases of complete bilateral central blindness are recorded, in which the lids closed, and the eyes and head turned when exposed to light.

Disorders of the voluntary ocular muscles consist of spasms and paralyses. Mere irritation of the visual centers causes spasm, while destruction of the same part causes paralysis. Frequently spasm is only the first stage of paralysis. Both furnish the same local diagnosis. Paralysis may be peripheral, intermediate, or nuclear and central.

In *peripheral paralyses* both voluntary and involuntary movements are abolished; the nerve-fibers and ganglion cells of the nuclei, from which the nerve fibers originate, undergo degeneration, which finally involves the muscular fibers also. Such paralyses may be located in the eye or orbit, in the nerve trunks within the skull, or in the brain itself. Intra-cranial and root paralyses are difficult to diagnose; but if the cause is in the orbit, it may usually be determined. If the inferior oblique and the internal ocular muscles alone are affected, it is probably orbital. Otherwise, exophthalmus, its being unilateral or bilateral, the number and kind of muscles involved, pain on pressure or movement, absence of the usual signs of inflammation and of swelling or tumor, and, later on, atrophic conditions at the entrance of the nerve, may be sufficient to make up the diagnosis of peripheral paralysis.

Intermediate paralyses present practically the same symptoms as peripheral, all movement being suspended, and the nerves and muscles degenerating sooner or later. Differentiation from the peripheral forms depends upon our knowledge of the anatomical relations of the nerve nuclei. If the cause is in the nuclei, only single muscles of one or both motor oculi nerves are affected. It is probably nuclear if, for example, the sphincter pupillæ of one eye alone is paralyzed, or if both pupils are alone involved, or if there is ptosis of one lid only. The diagnosis is pretty clear also when the process progresses very slowly, involving the muscles one after another, in accordance with the anatomical arrangement of their nuclei. The forms of nuclear paralysis are both acute and chronic, and arise from numerous causes, including hemorrhages, tubercle, in-

juries, poisons, infectious diseases, bulbar paralysis, progressive muscular paralysis, tabes, etc.

Central paralyses cannot well be demonstrated anatomically, since after passing the nuclear reign, the motor fibers no longer run in bundles. Irritation of the cortex of the occipital lobe (the visual sphere) causes ocular movements toward the opposite side. Irritation of the anterior part of the lobe moves the eyes downward, and of the posterior moves them upward. Under certain circumstances the eyes simply remain fixed in one position, or one or both turn in. The more peripheral the irritation, the greater the movement excited; in fact, irritating the macular portion of the visual sphere excites little if any movement, but the macular portion appears to be the cortical center for the finer adjustments of the eye, viz., convergence and accommodation, which take place under conscious vision. The cerebral cortex is the motor center for voluntary ocular movements due to light impression, and each lobe controls movements in the domain of its half of the field of vision on the opposite side. All movements of the eyes which are excited by the cortex are associated and conjugate; hence, if the visual sphere (occipital lobe) is destroyed, not only is the vision disturbed, but the voluntary ocular movements following light impressions in the lost portion of the field of vision are abolished. On the other hand, involuntary reflexes, after unconscious light stimuli, such as reaction of the pupils, remain intact, as do both voluntary and involuntary movements of the eyes after other than light stimuli, as from cutaneous irritation, word of command, etc. However, the voluntary conjugate movements of the eyes in the blind are peculiar in that the eyes unconsciously pass again after a while into a position of rest.

Cortical spasm of the ocular muscles is also always associated and conjugate; examples of this are tonic and clonic movements to the right or left, rolling of the eyes, spasmodic convergence, etc. The relations between the visual sphere, the visual cortex of the occipital lobe, and

the other portions of the brain, particularly the frontal portion, while extremely interesting, are too intricate to be dealt with in the scope of this paper. Inasmuch as the frontal brain is connected by centripetal as well as centrifugal fibers with all other parts of the brain, it dominates the balance of the cerebral cortex, so that by it all conscious movements are incited, modified, or inhibited. It has direct and indirect connection with all the other centers, viz., the centers of hearing, speech, writing, taste, smell, touch, etc., and for this reason diseases of the frontal cortex, while they disturb vision in various ways, do not permit of localization through the eyes, because every portion takes part in the functions of all the organs of sense and motion.

Psychic blindness interests us because it may be mistaken for real blindness due to disease of some portion of the visual sphere. It is due to destruction of the cerebral cortex, demolishing the optic memory-pictures, so that objects although seen are not recognized. In psychic blindness, however, the visual sphere, with its peripheral connections, is intact and capable of function. Objects are seen and fixed perfectly, but are recognized only by the aid of some other sense, for example, by touch. This and other transcortical disorders of vision such as word-blindness, alexia, agraphia, etc., are really forms of aphasia in which the speech center and its associated centers are the parts affected, the visual tract remaining unimpaired.

A knowledge of disorders of the *involuntary muscles* of the eye and of the *sympathetic* is of the highest importance, because the behavior of the pupil plays an important part in the diagnosis of diseases of the brain. These muscles are the *sphincter pupillæ* and the *ciliary muscle*, and the *dilator pupillæ*, the former two being supplied by fibers which pass through the motor oculi and originate near the motor oculi nucleus, and the latter by the sympathetic.

The *ciliary muscle* seems to be voluntarily innervated, together with convergence, through the perceptive center

of the visual sphere, and is under the control of conscious vision. The cerebral cortex has, however, no power over the sphincter of the pupil.

Normally the pupils are equal in size, contracting equally when light enters either eye (consensual reaction) and under accommodation and convergence, and dilating from paralysis of the motor oculi or stimulation of the sympathetic nerve. The equality of the pupils is due to the fact that fibers pass to both nuclei from each optic nerve, hence inequality of the pupil is always pathological.

The *reaction of the pupil to light* is a highly valuable sign of the existence of light perception. Ordinarily when light is thrown upon the retina the pupil contracts, proving that the patient sees. The impression is conveyed through the optic nerve, chiasm, and tractus, to the primary optic centers of both hemispheres, and from thence to the bilateral nuclei of the sphincter of the pupil.

Disorders of the pupillary reflex are either centripetal, centrifugal, or central.

Centripetal disorders are bilateral because they are visual disorders also. The reaction to light is absent when the light falls upon the blind eye, but is present and equal when it falls upon the seeing eye (consensual reaction). In all centripetal disturbances, the pupils react to accommodation, convergence, and cutaneous irritants.

Centrifugal disorders are unilateral, except when the causal affection is situated on both sides. In unilateral paralysis of the sphincter pupillæ, whether the cause is intraocular, orbital, basal, or nuclear, reaction to light is absent in the paralyzed eye, although light perception is perfect. Neither does it make any difference which eye the light falls upon; the pupil of the healthy eye reacts normally whichever eye the light enters. In centrifugal disorders convergence and accommodation are often disturbed also.

Central pupillary disorders are due to disturbance or interruption of the connection between the primary optic ganglia (ant. corp. quadr. and geniculate body) and the

nucleus of the sphincter of the pupil; but in both their functions are preserved. Conscious vision and voluntary movements in uncomplicated cases, and accommodation and convergence, are sometimes intact, but light causes no reaction of the pupils (reflex-rigidity of the pupils). This condition is frequently present in certain diseases located near the nucleus of the motor oculi, such as tabes dorsalis. Dilatation of the pupil would naturally be looked for in reflex rigidity of the pupil, but, on the contrary, myosis is generally present. This is brought about by irritation of the ganglion cells which lie within the network of the sphincter nucleus, and as this irritation may not be exactly the same on both sides, the pupils may not be the same either. According to Knies, "Difference in the size of the pupils without any local cause in the eye (inflammation, etc.), and without pronounced diminution in their mobility, is a symptom which points to the region between the primary optic ganglia and the motor oculi nucleus" (irritation or beginning paralysis).

The *sympathetic* plays its part too in the various pupillary conditions. Cutaneous irritation about the head, face, and neck dilates the pupil through the sympathetic, hence in paralysis of the motor oculi this reflex is retained. Irritation of the sympathetic, from its control of the dilatator pupillæ, the dilator of the lid, and Mueller's muscle, enlarges the pupil and the palpebral aperture, protrudes the eyeball, and prevents the upper lid from following the eyeball downward normally (Graefe's symptom). As a rule, accommodation, refraction, and tension remain normal. Paralysis of the sympathetic causes the opposite condition, myosis, while the pupil reacts normally to light, together with slight ptosis, and enophthalmos; as in irritation, accommodation, refraction, and tension remain unchanged.

EYE CONDITIONS DUE TO BRAIN LESIONS.

Hyperæmia and anæmia of the retina often indicate disturbances of the brain, but are not sufficient alone to decide the presence of such conditions. In chronic cases the

vascular conditions of the retina and the brain are apt to be more or less the same.

Optic neuritis is one of the most frequent symptoms, and occurs in the following conditions: cerebral hemorrhage, embolism, thrombosis, abscess, tumors, meningitis, paretic dementia, injuries to the brain, and multiple sclerosis, as well as others. It is diagnostic of tumors of the brain, being found in ninety to ninety-five per cent. of all cases. As a rule, it develops suddenly (in twenty-four to forty-six hours), sometimes following relief of headache and other symptoms of tumor. The swelling of the papilla develops rapidly, projecting forward into the eye so as to cause a difference of four or five diopters between the refraction of it and the retina. Later the redness, swelling, etc., give place gradually to whitening and other characteristic signs of atrophy. Choked-disk is usually bilateral, but not always equal in time of occurrence or in degree. If unilateral, it is almost always on the same side as the tumor, and the latter is situated well forward in the brain. It occurs most frequently in the cerebellum and adjacent parts, and least frequently in the frontal lobe. The typical choked-disk of cerebral tumor is said to begin as a pure œdema of the interocular end of the nerve, but inflammation follows later, so that most writers class both choked-disk and neuritis under the one term "optic neuritis." Compression of the nerve from inflammation or any cause produces choked-disk, and uncomplicated cases may disappear, leaving good vision. It is also frequent in meningitis and cerebral abscess, where it begins usually as a neuritis of the nerve, followed by atrophy and partial or complete blindness, but in no case is it so diagnostic as in tumor.

Atrophy of the optic nerve generally follows optic neuritis or choked-disk, hence it would be looked for at some stage in the above affections. Simple or non-inflammatory atrophy, however, occurs in various brain affections, and sometimes when no cause can be assigned.

Hemorrhages into the retina accompany many profound as well as transitory brain disorders. Many times retinal

hemorrhage is the precursor of cerebral apoplexy. It occurs from intercranial tumors, etc., interfering with the circulation of the eye vessels, in atheromatous degeneration, from injuries to the brain, etc.

Vision is disturbed, lessened, or destroyed in nearly all brain disorders. Either functional or organic disease of any portion of the visual tract may produce corresponding disturbance of vision; the blindness may be complete, or a portion only of the visual field may be affected, as in scotoma, and hemiopia, or it may be merely perverted as in the hallucinations or illusions of the insane or delirious, in color-blindness, etc. It may come suddenly, as in cerebral hemorrhage, or it may take years to develop, as in simple optic nerve atrophy and in slowly progressing diseases of the brain. Next to disturbances of the ocular muscles, it is perhaps the most important aid in diagnosing and localizing brain lesions.

If an optic nerve be wholly destroyed in any way, conduction is interfered with, and the eye is blind. This unilateral blindness would locate the lesion in the optic nerve below the chiasm. If only part of the nerve fibers are destroyed, the function of the part of the retina supplied by those fibers will be lost. Therefore, according to the site and extent of the lesion, central or peripheral scotoma, or concentric or sector-shaped narrowing of the visual field will result. If the narrowing of the field for white and for colors takes place uniformly, it generally indicates that the disease is progressing slowly or is stationary; on the other hand, if the fields for colors as compared with the general field are narrowed disproportionately, the progress of the disease is usually rapid.

Complete destruction of the chiasm or optic tracts produces complete bilateral blindness. If the injury is partial only, both eyes are affected, but not often the same, as more of either the crossed or uncrossed fibers are involved than of the other. If an entire optic tract is injured, typical homonymous hemianopsia results, the retinal halves on the same side being lost; both pupils react to light falling upon

the seeing halves of the retina, but not when it falls upon the blind parts only. This feature is common to all peripheral visual disorders.

Hemianopic blindness results also from destruction of the primary optic tract, but disturbances of vision alone would not locate a lesion of this tract definitely. The anterior corpora quadrigemina being the center for associated movements of the eye, disturbance of these movements, in addition to hemianopsia, would locate the lesion in the primary optic tract.

Diseases of the visual sphere (the occipital cortex) affecting only one side produce hemianopsia. If both spheres are destroyed total blindness results. Foerster (Arch. F. Ophth. XXXVI. 1) records a case, however, in which there was good central vision, a small zone about the point of fixation remaining unaffected, although both occipital lobes were destroyed. In such cases the ophthalmoscope reveals no changes, and the involuntary reflexes remain intact. Absence of light perception, therefore, with reaction of the pupils to light and retention of involuntary reflexes, irrespective of whether the light falls upon sensitive or insensitive parts of the retina (*vide* optic tract lesions), point unmistakably to lesion of the occipital lobes.

Disturbance of the pupillary movements occurs in many brain disorders, among them being cerebral anæmia and hyperæmia, hemorrhages, embolism, thrombosis, abscess, tumors, meningitis, injuries, bulbar paralysis, Cheyne-Stokes breathing, diffuse encephalitis, paretic dementia, and insanity.

The following table may aid in a rapid understanding of the relations and reactions of the pupil:

NERVE SUPPLY.	ORIGIN.	DISTRIBUTION.	FUNCTION.
Short ciliary.	Ciliary ganglion.	Ciliary muscle, iris, and sphincter pupillæ.	(On irritation) contracts pupil.
Long ciliary.	Nasal branch of ophthalmic division of the fifth, direct.	Ciliary muscle, iris, and sphincter pupillæ.	(On irritation) contracts pupil.
Sympathetic.	Cilio-spinal center of cervical spinal cord.	Dilator pupillæ.	Dilates pupil.

For pupillary constriction, the optic nerve is the afferent, and the third nerve (motor oculi) is the efferent nerve.

Contraction of pupil occurs from:

Optic nerve stimulation (light, etc.).
Oculo-motor stimulation (light, etc.).
Stimulation of their centers in the brain.

Sympathetic nerve paralysis (or division).

Accommodation or convergence.

Fullness of vessels of iris.

Dilatation of pupil occurs from:

Optic nerve paralysis or division.

Oculo-motor paralysis or division.

Destruction of their centers.

Sympathetic stimulation.

Sensory or psychic stimuli.

Anæmia of vessels of iris.

It may be said that, as a rule, dilatation of the pupils indicates pressure on the brain from some cause. Contraction of the pupils means irritation of the brain.

In cerebral hemorrhage, mydriasis is almost always present, on the same side as the lesion, and the same is true of meningeal hemorrhages; it may be bilateral if the hemorrhage is very extensive. Contraction of the pupils occurs if the hemorrhage should penetrate into the ventricles, probably because of irritation of the sphincter nucleus.

In abscess of the brain we would expect the condition to be similar to that of apoplexy, extreme myosis in the course of cerebral abscess indicating rupture into the region of the ventricles.

In cerebral tumors, mydriasis occurs as a symptom of compression, the exception being in cases like aneurism of the carotid within the skull, in which myosis results from pressure upon the sympathetic fibers of the eye, which pass through the carotid plexus.

In injuries to the brain, mydriasis is likely to be present from compression, due to hemorrhage or exudation following secondary meningitis. Hutchinson says that in concussion sluggishness of the pupil is the rule, rather than pronounced contraction or dilatation.

Meningitis presents both mydriasis and myosis at different stages. In the early stage irritative symptoms are generally present, and the pupils may be constricted, but as blindness comes on, or compression arises, dilatation of the

pupil takes place. All sorts of pupillary reaction may be looked for, however, during the course of the disease, even to rapid alternation of contraction and dilatation of the pupils. This condition is characteristic of Cheyne-Stokes breathing, contraction taking place during the respiratory interval, and dilatation on renewal of respiration.

In insanity and paretic dementia (progressive degeneration of the cortex, most marked in the frontal lobe), myosis is the rule, although sluggishness is present in melancholia, and inequality of the pupils is frequently observed in the various forms of insanity. The so-called reflex-rigidity of the pupil is quite characteristic of paretic dementia, being present in about fifty per cent. of the cases. Reaction to light stimuli is gradually lost, although the patient may see well, and the pupils react to convergence and accommodation. Late in the disease the latter reaction is lost also. The pupils may be narrowed, dilated, or normal in size. In the beginning they may contract or dilate unequally and may be irregular in shape, but later reflex-rigidity becomes established, and reaction, even to cutaneous irritation, is abolished altogether. In some cases reflex-rigidity is, for a long time, the only prodromal symptom of the disease.

Disorders of the voluntary ocular muscles are frequently diagnostic of brain affections. In cerebral hemorrhage conjugate deviation of the eyes and head toward the side of the lesion is very frequent; the exceptional cases, when the deviation is toward the side opposite the lesion, are those in which the hemorrhage is very small, or situated in the frontal brain. If improvement takes place, it is indicated by the disappearance of conjugate deviation and other irritative symptoms; later still, paralyses, such as inability to move the eyes toward the side opposite the lesion, disappear also. Although the case stops short of inflammation, and recovery follows, it is rarely complete, some slight defects generally persisting in the organs of special sense, of motion, or of the mind. Many times these latter conditions must be waited for, to definitely locate the site of the lesion.

In embolism and thrombosis the symptoms are similar to those of apoplexy.

In cerebral abscess conjugate deviation of the eyes is usually observed. About thirty per cent. of abscesses are located in the cerebellum, nearly all others being situated in the temporal or parietal lobes. Ptosis occurs in many cases in which the cortex is involved, and rupture of an abscess causes all sorts of basal symptoms, such as spasm, paralyzes (both sensory and motor), neuro-paralytic keratitis, etc.

Muscular disturbances of some sort are not as characteristic of cerebral tumor as is choked-disk, but are generally present at some period of its growth. They are usually irritative symptoms at first, but as the growth and compression increase, paralytic symptoms appear. Various observers agree that ocular paralysis of one or both eyes are frequent, and Gowers says the abducens is especially apt to be affected because of its long course in the skull. Conjugate deviation of the head and eyes is not rare.

Basilar meningitis gives rise to very many irritative and paralytic symptoms, the abducens and motor oculi being most often involved. Conjugate deviation, ptosis, and nystagmus are frequently observed.

Few muscular disorders attend cases of pure insanity, but in parietic dementia they comprise the most important and characteristic symptoms. Both voluntary and involuntary muscles are affected, and one or all may be involved. Outside of the pupils, the ciliary and abducens are most frequently affected. Paralysis may be the first symptom, and while it may disappear after a time, relapse occurs, and the final involvement of all the muscles of the body well deserves the term "general paresis."

Injuries to the brain cause disorders of the eye muscles, depending upon the site of the injury, and the consecutive hemorrhage or meningitis, etc.

Bulbar paralysis (glosso-pharyngo-labial paralysis) presents many sensory as well as motor paralytic symptoms, involving both external and internal ocular muscles. Affec-

tions of the eye muscles predominate in another special form of bulbar paralysis, viz., superior polio-encephalitis or progressive ophthalmoplegia. The paralyses are bilateral, complete or incomplete, usually irregular, affecting either external or internal muscles, or both, and are progressive, although alternate improvement and relapses mark the course of the disease. The acute form begins with deep somnolence, but not unconsciousness; ocular paralyses quickly develop and progress to complete ophthalmoplegia, death occurring within a week or two in somnolence, which serves to differentiate it from simple nuclear paralysis.

Nystagmus and twitchings of the eyes predominate in multiple sclerosis. While nystagmus is rare in other brain affections, it is estimated to occur in nearly fifty per cent. of cases of sclerosis. It is due to interruption of conduction between the oculo-motor cortex and the nuclei of the ocular muscles. In addition to the tremors or twitching movements of the eyes toward the object the patient wishes to see, other ocular paralyses are not infrequent.

It is manifestly impossible to exclude from a consideration of the relations of brain lesions to eye disorders the influence of the various spinal and general nervous diseases which involve the brain primarily or extend to it as they progress, but it is equally impossible to discuss them in the time allotted this paper. It is already too long, and the writer can only hope to do so at some future time.

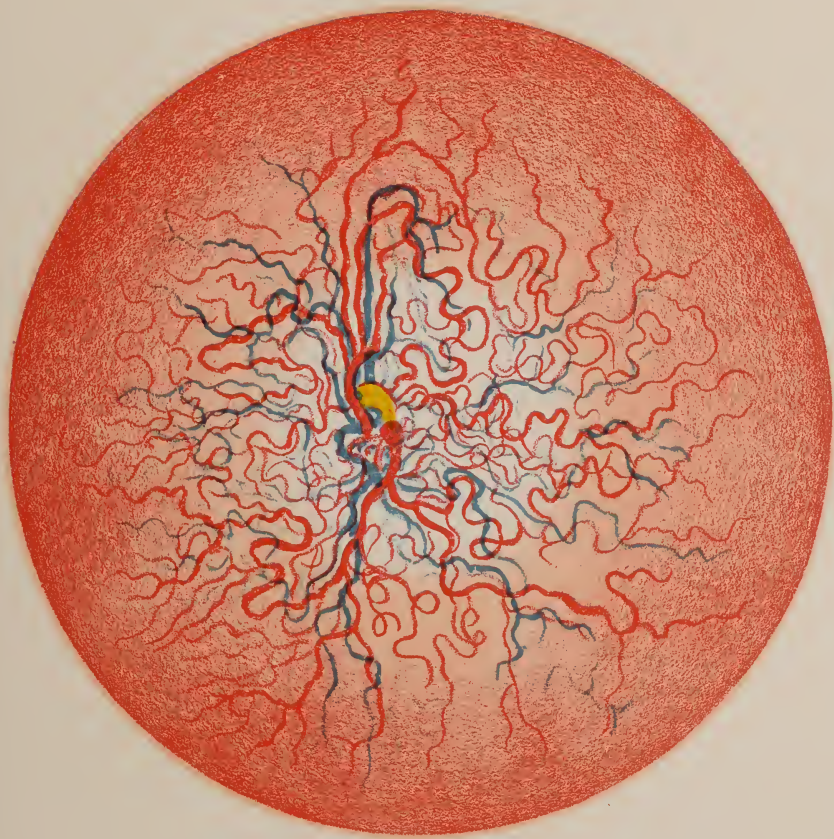
AN ILLUSTRATED CLINICAL CASE.

BY G. N. SEIDLITZ, M. D., ST. LOUIS.

THERE are several reasons for presenting this case to your notice. It may enlist the attention of all kinds of practitioners. The entirety of the symptoms invests it with an interest to every physician: the surgeon will inquire whether or not it is operable; the peculiar eye symptoms will at once arrest the scrutiny of the oculist; even the neurologist will be repaid an examination. It is hoped that some knowledge may be gained by us in a close investigation and thorough discussion of the case, and also that some benefit therefrom may accrue to the patient. I have to thank the little patient herself for illustrating the case in person and Dr. C. H. Godman for a drawing of the fundus oculi as seen by the ophthalmoscope. Let me say here, parenthetically, that we do not claim this picture to be an exact reproduction of the diseased fundus; it is only intended to convey an idea of it, which may be better obtained by a comparison with that of the normal fundus.

The little girl in question is $7\frac{1}{2}$ years old; weighs about fifty-two pounds; as you will observe, she has a light complexion in respect to hair, skin, and eyes. She is of nervous temperament and mentally precocious; she goes to the kindergarten with comparative regularity.

The medical history of her parents discloses nothing which would have any ætiological bearing on the case. She was born with what was considered an enormous caput succedaneum. As the tumefaction at the occiput decreased, it gradually extended in an oblique direction across the vertex, to the region over the



temporal margin of the right eye ; this latter is the location of what remains of it. It required about a year for this. In consistency it appears by palpation to be doughy or spongy.



FIG. 1. Right.

The hair which ought to be present on that part of the scalp involved has always been absent.

About ten months ago our little patient was stricken with left-sided motor paralysis, the immediate effect of which, in regard to motion, has remained about the same up to this time, or perhaps has improved a little. You can easily observe this symp-

tom ; perhaps an exception may be noted here in respect to the facial muscles. The dilated superficial blood-vessels on either cheek and other parts of the face must be noted ; the bluish dis-



FIG. 2. Left.

coloration so marked on right side of head and elsewhere is due to enlarged veins.

Now for the symptoms which most concern the oculist. The first thing which strikes the observer is the slight drooping of the right upper eyelid, and its bluish discoloration ; upon instructing the patient to look down, at the same time slightly elevating

the lid, a mass of blood vessels situate under the lid is brought into view—apparently the cause of the ptosis. An occasional small hemorrhage from this eye occurs at night—its source is evident. About three months ago the eye appeared to be turned toward the temple in a marked degree and the pupil to be dilated; these two symptoms in conjunction with the ptosis pointed to motor-oculi paralysis; but, as they do not now obtain, I must have been mistaken. The ptosis, too, may be due to weight and swelling of the lid. The little exophthalmos at present observable may be easily accounted for from the nature of the case.

The striking feature of the ophthalmoscopic picture is the marked tortuosity of the blood vessels; the entire central part of the fundus is occupied by such a mass—or almost so; they turn and twist upon themselves in every conceivable shape and direction. Only a small part of the disk is left exposed. The veins, of course, are more tortuous and larger in caliber than the arteries; the reflex light-streak is very marked in both. Breaks in the continuity of the vessels can be seen. Running along the side of the main ascending and descending veins is a white streak—what purports to be an atrophy of the choroid. The choroid is deeper in color than normal, as we should naturally expect. Toward the periphery the condition just noted is not so pronounced, so that the red background of the fundus comes more into view. The acuity of vision has been tested three times: three months ago it was limited to the counting of fingers, with the undilated pupil; under homatropine it increased to $\frac{1^5}{200}$, a proof that peripheral was better than central vision; about one month ago, under atropine, it was $\frac{20}{200}$; about one week ago, with the undilated pupil it was about $\frac{20}{120}$. We see that vision has improved without treatment. The field of vision seems to be about normal. It is hardly necessary to add that no kind of lens tried has improved the vision of this eye. The vision of the good eye, *i. e.*, the left, is about normal.

The above is as complete and concise a record of the case as I know how to make. The case was brought to me for the double purpose of determining the diagnosis and prognosis—in short, to decide if it were operable. I humbly confess that I have arrived at no definite conclusion about the diagnosis. Several oculists in this city

have examined this patient ; and one surgeon has operated or attempted to operate on the swelling on the head, presumably for the removal of a fatty tumor. A few of the oculists referred to have named the whole lesion a hematoma ; one of my friends—an old-school oculist—who examined the case with me, and afterward looked up the subject in his books, has declared it a cerebral angioma. I am inclined to agree with him. I have carefully examined all the ophthalmoscopic plates I could get hold of, but did not see one similar to the fundus in this case. All thus far are agreed on these two prognostic points, viz.: that an intra-cranial operation is not feasible ; and that the vision of the affected eye cannot be restored.

OCULAR MUSCLES.

BY CHARLES LESLIE RUMSAY, A. M., M. D., BALTIMORE, M. D.

THERE is no subject in the whole range of modern surgery that has required any greater study by the writer than this one: To what extent can glasses overcome muscular error? When to operate and when not to operate on a muscle? Shall a tenotomy be performed or the opposing muscle be advanced?

These are the queries, with various ocular phenomena caused by the extrinsic muscles, that have often perplexed him.

The rhythmic exercises—the looking alternately with prism at a candle-flame, fifteen to twenty feet distant; then, without the prism, at the finger twelve to fifteen inches from the eyes; the functions of the oblique muscles; and other ocular phenomena caused by the eye-muscles—were elucidated by the study of Dr. Savage's methods and exercises.

Experience and study have taught the writer when and on which muscle to operate, the relationship of convex and concave lenses to the extrinsic muscles.

Correct diagnosis is essential for scientific therapeutics. The more carefully we analyze the muscular error and the more thoroughly we go into all the features of our cases, the less likely are we to commit operative blunders, and the smaller will be our proportion of failures. It requires different procedures to remove muscular error, depending upon its cause.

The common purpose of all the extrinsic ocular muscles

is the production of binocular single vision, in obedience to the law of corresponding retinal points.

In one hundred consecutive cases in private practice, there was found forty-two per cent. orthophoria. This does not mean fifty-eight per cent. of heterophoria—each case requiring a surgical operation. All muscular anomalies no more require surgical operations than do six children out of seven require glasses, for fourteen per cent. of the children are emmetropic.

In the writer's practice, where cases are perplexing, to ascertain if the deviation is variable or constant, it is his effort to keep the patient under observation for one month previous to advising a surgical operation.

Small deviations may produce severe pain. There may be a latent deviation, as we observe there is a latent hyperopia. In these cases, a mydriatic is essential to observe the degree of exophoria, or esophoria without accommodation.

The natural vertical meridians of the cornea must be kept parallel or double vision will result. As the ciliary muscle and all the extrinsic ocular muscles, except the superior oblique and the external rectus, are supplied by the third nerve, the third nerve is the nerve of accommodation; the accommodation, therefore, must embrace the ciliary muscle and all the external ocular muscles supplied by the third nerve. The internal and inferior recti are attached nearer to the cornea than the external and superior recti. The oculomotor center, beneath the aqueduct of Sylvius, is an interesting study. Whenever one of the muscles supplied by the third nerve is called into activity, there must be a corresponding activity of the other muscles supplied by this nerve—therefore accommodation, the sphincter of the iris, and convergence have a normal relationship, disturbances of which will produce simple asthenopia with the most complex symptoms.

If such a physiological action did not exist at the time of accommodation, the vertical meridians of the retina would be turned outward below and inward above from the

vertical plane. Instead of the upper part of the eyes being turned outward by the inferior obliques, to retain their vertical plane in accommodation, the superior recti and inferior obliques counterbalance each other. The superior obliques, which turn the eyes downward and outward, relax with the external recti, which allows the inferior recti and internal recti to turn the eyes downward and inward and which keeps the eyes in their vertical plane. When we read a book or paper, it is held below the horizontal plane of our eyes. The nearer we hold the paper to us, the farther it is below the horizontal plane.

Nothing is more perfectly adjusted than a pair of emmetropic eyes, free from paralysis, from paresis of their muscles, or from lesions. There is no machine or organ that could lose its balance so easily. The controlling impulse is first to see as distinctly as possible and then to have an image of one object on each macula.

Errors of refraction can bring about disturbance in the correct balance of the external ocular muscles.

In the writer's opinion an over counterbalance of the muscles of the eye can easily occur, which would cause exophoria with hypermetropia and esophoria with myopia. To illustrate: the first impulse with hypermetropic eyes causes the ciliary muscles to contract, which brings about an involuntary contraction of the internal recti muscle. Homonymous diplopia is prevented by a voluntary contraction of the external recti muscles. It is believed it is the overvoluntary contraction of the external recti muscles in some cases that causes exophoria or the line of central vision to move too far outward. Correct the hypermetropia and you remove the necessity of accommodation over and above what is required by the emmetropic eye. The internal recti muscles not being forced to contract, the voluntary contraction of the external recti muscles would not be called for, and the exophoria with hypermetropia is corrected by the convex lenses.

If one eye has more hypermetropia than its fellow and both are corrected by accommodation, the torsion down-

ward and inward will be greater, of the eye with the larger amount of hypermetropia. Consequently the vertical meridians of the retina will be thrown in a different plane, which will give the oblique insufficiency.

The same process of reasoning can be applied to myopic eyes where the accommodation is entirely or nearly suspended and the stimulus is less for convergence, and the eye is turned outward and downward by the external rectus and the superior oblique.

When the inferior recti muscles are called upon to direct the visual axes below the horizontal plane of the two eyes, they, at the same time, tend both to converge these axes and to rotate the eyes so that the naturally vertical meridians would diverge above. To counteract this latter tendency, the superior obliques are thrown into a state of activity, and the parallelism of the vertical meridian is maintained.

The same is true of the superior recti and inferior oblique muscles. With every contraction of the superior recti muscles there must be a corrective action of the inferior oblique muscles. Thus, it is seen that the recti and oblique muscles, while opposing one another in action to a certain extent, work together in effecting binocular single vision by keeping the retina so related that the images fall on corresponding retinal points.

It is believed that the eyes deviate vertically as well as horizontally where there is a difference in the refraction of the two eyes; that insufficiencies of the oblique muscles are due to a difference in the refraction of the two eyes, and they cannot be found to exist when the refraction is the same.

It is of the utmost importance to properly place the axes of cylindrical lenses to relieve torsion of the eyeballs.

Placing the 6° double prism before the right eye, if the left eye (the one under test) shows the middle to dip to the right, there is insufficiency of the left superior oblique muscle. If the line dip to the left, there is insufficiency of the left inferior oblique muscle. Dr. Savage found that

the insufficiency of the oblique muscle can be confirmed by rotating a cylindrical lens, plus 2 dioptries, to an axis that would increase the dipping of the middle line—and *vice versa*, to place the axis of the cylindrical lens so as to cause the middle line to be parallel with the two lines seen by the double prism.

The gymnastic exercises with these cylindrical lenses, placed in frames of German silver with circular rims to allow rotation of the lenses, as advised by Dr. Savage, have developed the weak muscle and benefited patients of the writer.

The patient fixes his vision on a light twenty feet distant with cylindrical lens, plus 2 dioptries, before each eye. The axes of the lenses are rotated from the minimum to the maximum effect, by intensifying the dipping of the line as previously ascertained by the double prism in establishing or controverting the diagnosis.

Where the phorometer shows esophoria in the far and near tests and an adduction of 40° or more, it is advised to give a full correction of the hypermetropia, thus curing the pseudoesophoria. That which remains may be cured by prismatic exercises or a tenotomy. Should the adduction be below 40° , prismatic exercises should be given. Where the adduction is very low there is associated low abduction. It is not wise to operate on these cases. Develop both the internal and external recti muscles by carefully prescribed exercises. At the Section of Ophthalmology A. M. A. at Baltimore, Md., May, 1895, the writer heard a paper read where an exercise from side to side proved efficacious in strengthening the external and internal recti muscles, and prismatic exercise to strengthen the external recti muscles was prescribed. If surgical procedure is necessary, it is advised to advance the external recti muscles.

Where the phorometer shows exophoria in both the far and near tests, with an abduction of more than 8° , partial tenotomy of the external recti should be performed. Where the abduction is less than 8° , prescribe exercise to

develop the internal recti muscles and strengthen both the internal and external recti by side to side exercise. If a surgical operation proves essential, advancing the internal recti muscles would be the line of treatment. Where the abduction is 8° , never operate on the external recti muscles. Use prismatic exercises to develop the internal recti muscles and let the *dernier ressort* be the advancement of these muscles.

Where the phorometer shows the hyperphoric condition to exist, its exact quantity must be carefully acquired. Where the sursumduction of the hyperphoric eye is only 3° , the normal, the treatment should be by exercise alone. If an operation be necessary, it should be the advancement of the inferior rectus of the hyperphoric eye. Should there be a greater degree than 3° , a partial tenotomy of the superior rectus of the hyperphoric eye is advised.

Rhythmic exercise, as advised by Dr. Savage, is the alternate contraction and relaxation of the muscle to be developed. The patient looks at a candle at a distance of fifteen to twenty feet with prisms, placed in a steel frame, in accordance with the muscle to be strengthened; after five or ten seconds, the prisms are lifted up to allow the light to enter the eyes uninfluenced. At the end of five or ten seconds, the prisms are again dropped before the eye. This exercise is continued from five to ten minutes and repeated daily in accordance with the general condition of the patient. Never cause fatigue nor increase the nervous element in the case.

In conclusion, let the writer say, too much praise cannot be given Wilson's phorometer. The writer has all the various appliances in his office to test muscles of the eye, and he finds Wilson's phorometer more expeditious and reliable in the information it communicates than any other instrument.

THE OPTICIAN VS. THE OCULIST, ETHICALLY AND COMMERCIALY CONSIDERED.

BY HAYES C. FRENCH, M. D., SAN FRANCISCO.

THE present gravity of the situation, certainly as it exists on the Pacific Coast, warrants the serious question whether that portion of the oculist's calling that pertains to the correction of refractive errors is not likely, at the present rate of loss, soon to disappear under the thrift and enterprise of the ubiquitous optician?

In this age of fierce competition the learned professions are universally organized, or organizing, to secure their legal, ethical, and commercial rights as against incompetent and illegal competitors. The writer believes the time is ripe for such action on the part of the homeopathic oculists of America, and with a view to organization for such purpose, would respectfully call the attention of his colleagues, first, to the

Ethical Phase of the Question.

The first query that arises in the thoughtful mind is whether optometry constitutes any legally recognized part of the practice of medicine or surgery, either or both, and whether the optician, in assuming the responsibility of such practice, does not also assume a part of a function that can only be safely and legally performed by one specially commissioned for such work by the state?

The legal practice of medicine and surgery includes the examination, diagnosis, and treatment of all diseases, deformities, and injuries incident to any organ or part of the human

body. The oculist, in safely and successfully prescribing glasses, has frequently to take into account a complex train of closely related sympathetic nervous troubles, all of which the optician assumes to know and understand when he prescribes glasses for any defect, with perhaps the sole exception of the condition of simple presbyopia, and, even in determining this trouble satisfactorily, he must often enter the field of the physician. Hypermetropia, myopia, and astigmatism are due to physical defects in the organic structure of the eye, yet at the same time their correction often involves an intimate knowledge of the function of accommodation, and this part of a physician's office the optician assumes when he prescribes glasses for these cases; and failing to acquaint himself with these related truths, he, besides trenching upon the domain of medicine, is guilty of malpractice to the extent of his ignorance. Empirically the optician learns that certain refractive anomalies are frequently associated with headaches, and glibly promises immunity from the head trouble if the customer (patient) will take his glasses (prescription). What, in this case, is the difference in legal responsibility between this merchant-physician and the legalized physician whose office he usurps? The spectacle-doctor diagnosed headache and prescribed glasses; with what ethical right, if he has not a doctor's diploma and license? It is all smooth sailing for the doctor minus the diploma if his prescription happens to relieve the migraine, and opens the way for the prescription of a simple collyrium which the optician's "cousins or his sisters or his aunts" had found good for "sore eyes"; but what about the over or under correction in cases of accommodative spasm and kindred abnormalities, which frequently produce headaches and perhaps lay the foundation for serious, if not incurable, neuroses or even insanity? Scientific and up-to-date optometry is so intimately linked with a knowledge of heterophoria and its treatment, and a long train of complex nervous reflexes in relation to other organs of the body, as to require of the finished diagnostician a profound knowledge of human anatomy and

physiology as a whole, and even with all these accomplishments in superlative degree the true oculist is not boasting of infallibility ; yet he must compete with practitioners who make no pretensions to even the most rudimentary knowledge of these subjects. In case of acute glaucoma, optic neuritis, or amotio retinæ, the meddlesome refractionist might, by deferring decisive and necessary action, entail serious if not fatal consequences to the too confiding patient. Surgeons require instruments, but instrument-makers do not assume to be surgeons. So also in relation to the druggist and the physician, why then these exceptional honors to the makers of glasses ? The optician has a useful, honorable, and legitimate place in the community as an artisan and merchant ; but before he assumes the responsibilities of an oculist he should be required by law to give proof of an oculist's qualifications. A knowledge of the entire domain of medicine and surgery is required as a foundation for the practice of our specialty as refractionists ; why should an exception be made in the case of opticians ? With no better title than bottomless assurance an optician on the principal site of our city has put out his sign as "Oculist and Optician" ; the only wonder is that he was content to spell "Oculist" with one "c."

The Financial Aspect of the Question.

In the days of his business incipency the optician will be found in a generous reciprocal mood. He will not then forget the oculist when a tough refractive case seeks relief, and a share of the "valuable patronage of the house" will be turned to the account of the specialist who has sent prescriptions. However, as the years go by, the number of those who are sent to the optician, to return no more to the expectant oculist, increases just in proportion to the commercial wealth and influence of the fortunate house that has thus succeeded in blinding the specialist, if not his patients, while it has been urbanely transposing the law of "Meum et Tuum" as it relates to patronage. The professional refractionist is fortunate if his families return to him after

they learn that opticians are claiming to do an oculist's work free, or at largely reduced rates. The optician's first thought is for the sale of his wares, and his fees as an "oculist" are on a declining scale from \$5 to whatever the customer cares to pay, or zero; and when the oculist fee fades from view he is still cheered by the memory of the profits of the optician; and thus the honors and rewards of a pains-taking specialist are cheapened and the legitimate fruits of an arduous profession become the easy spoils of a piratical craft. Another difficulty with which we have to contend was illustrated in the case of an impecunious patient who, having negotiated the lowest rate for a specialist's services, asked the privilege of obtaining the glasses through a mercantile-supply agency. The firm to which he was sent by the agency proved to be the one on whose blank the prescription was written, and the terms obtained were below their quoted wholesale prices to oculists and the retail trade. If he or his friends need the glasses in the future they will turn from the oculist to the optician, and with a gratuitous or half-priced examination have their prescriptions filled on better terms than can be obtained by the oculist or retail dealer, and these are the equities existing between a learned profession and their unlearned and arrogant masters.

The only remedy for the evil is for the oculists to fill their own prescriptions, dealing directly with wholesale manufacturers, or to deal only with those retailers who do a legitimate prescription business and respect the rights of the educated specialist. In presenting these facts the writer does not undervalue the qualifications and the splendid refractive outfits of many leading opticians, nor does he blame these enterprising artisans for accepting so buoyantly what is being thrust upon them by their willing victims.

OTHÆMATOMA AND CHRONIC PERICHONDRI- TIS OF THE AURICLE.

BY JOHN O. MCREYNOLDS, B. SC., M. D., DALLAS, TEX.

THE object of this paper is to briefly report two illustrative cases of two similar affections which, in my experience, have been exceedingly infrequent, and judging from the very few recorded cases in literature, my own observation has been no exception to the rule. Indeed, my purpose will in great measure be accomplished if the recital of my own cases shall succeed in calling forth the reports of similar unpublished data that will lead to a more thorough knowledge of these conditions with regard to their causation, pathology, clinical history, and treatment.

The first case which I shall describe is one at present under my care, and it exhibits the characteristic features of a chronic perichondritis of the auricle of traumatic origin. The patient, Mr. L. W., twenty years of age and of a good history as to general health, was thrown from a bicycle during a race in Kansas on August 5, 1897, and received a slight wound of the upper portion of the auricle near its attachment. The wound was dressed without due regard to the established aseptic methods, but it healed after a few days so that the patient was led to expect no future trouble. There soon developed in the upper part of the pinna a moderate swelling which gradually extended downward, until finally, after the lapse of a few months, the entire cartilaginous structure of the ear became involved, resulting in an enormous enlargement of the ear in all diameters with complete closure of the external canal. The tumor was dark red in color, nodulated in form, very painful upon pressure, somewhat elevated in temperature, and presented its greatest prominence on the

anterior surface of the ear; obliterating, first, the fossa of the helix, and subsequently also the fossa of the concha, and later still the external meatus. The auricle was increased to many times its normal diameter, and it stood out from the head after the fashion suggested by the comic pictures of the "Yellow Kid." There were no constitutional manifestations worthy of



note, and the patient was never compelled to surrender his accustomed vocation. At one time, the inflammation was so intense and so extensive that it suggested the danger of erysipelas, and appropriate treatment was instituted to prevent such an occurrence.

Without entering into the details of the management of the case I will briefly refer to those measures which, in my judgment, were most efficient.

The medical treatment consisted in the administration of the tincture of the chloride of iron, the liberal use of the iodides internally, and the local employment of antiseptic solutions, followed by applications of a glycerine solution of iodine and the iodide of potassium. The surgical treatment consisted in aspirating the subperichondrial space, which resulted in securing a certain amount of bloody serum without producing any change in the size of the tumor. This was followed by very liberal incisions throughout the regions involved, in order to facilitate the thorough removal with a curette of all the morbid material between the cartilage and the perichondrium. The wounds were kept well drained by antiseptic gauze, carefully introduced every day by my assistant Dr. D. E. Seay. This material was examined very carefully by Drs. Shelmire and Smart of Dallas, and also by Dr. Brooks of New York, and it was found to be composed of elements entirely similar to that of a small round-celled sarcoma or granulation tissue. The following is the report of Drs. Shelmire and Smart :

DALLAS, TEX., December 22, '97.

DR. J. O. McREYNOLDS, DALLAS, TEX.

DEAR DOCTOR: The growth sent for examination is composed chiefly of granulation tissue in some portions infiltrated with pus cells—inflammatory. In many places, covering large areas, there are hemorrhagic deposits. Some sections show the perichondrium separated from the cartilage by these effusions of blood. Both cartilage and perichondrium show inflammatory changes. While there are some portions which are suspicious of a sarcomatous nature, we are inclined to the opinion that the growth is benign.

Respectfully,

DRS. SHELMIRE AND SMART.

The gradual and protracted progress of the trouble, together with the microscopic examination, might arouse the suspicion of a malignant growth, but the other characteristic clinical features of the disease were sufficiently clear to justify the diagnosis and treatment of chronic perichondritis of the auricle, instead of the graver prognosis and more radical procedures belonging to sarcoma. And thus we shall be able to save, with very little deformity, an ear

which otherwise might have been sacrificed without cause.

The second case, Mrs. H. of Terrell, Tex., presented considerable interest. The ear first became involved while on a visit in Fort Smith, Ark., in August, 1893. It began with swelling and intense pain in the external auditory canal. It developed in connection with acute rhinitis, and this fact, together with the severity of the pain, led the patient to suspect otitis media. But the pain, in a few days, subsided, without any discharge of any kind from the ear, leaving the patient, however, entirely deaf in the affected ear. She then returned to her home in Terrell, Tex., and was seized with a second attack, more severe than the preceding. She called in her family physician, who lanced the ear repeatedly, from time to time, without producing any marked relief, and without reaching any distinct purulent accumulation, but only a slight amount of yellowish fluid mingled with blood. The tissues below and in front of the ear appeared soft and swollen, so her physician, who is a very competent man, lanced in this situation also, but without the desired result. From this latter wound there developed a kind of fistula, which communicated with spaces within the substance of the auricle, and around the external opening of this fistula there grew a little mass of granulation tissue. Soon after this second attack, in which the external auditory canal was the part principally involved, there began two separate little tumors on the anterior aspect of the pinna. I saw the patient for the first time about three weeks after the appearance of these tumors, which had then coalesced, and presented a large, dark, bluish, slightly nodulated tumor, involving the greater part of the auricle, especially the anterior surface of the concha. The tumor was associated with a considerable degree of pain and tenderness, it was of recent and rapid development, the ear had been previously healthy, and the general condition of the patient was good. Upon a close study of the history of the case, as well as a careful examination of the tumor itself, I became convinced that it was a case of that rare condition known as chondromalacosis, or hæmatoma auris, as it was called by the older writers. Accordingly, I made a free curved incision, along the entire extent of the tumor and including the fistulous opening below the lobule. I then curetted

out thoroughly the cheesy gelatinous contents of the tumor and found that there was marked destruction of the cartilage in certain places, which afterward led to the characteristic deformity when it healed. Now, the histological character of that little mass of granulation tissue about the fistulous opening was identical with that of round-cell sarcoma, and a diagnosis of sarcoma would have led either to the entire removal of the auricle, with such other adjacent structures as were involved, or to the absolute withholding of all surgical measures for relief. But the diagnosis of chondromalacosis led to the less radical operation, which preserved the external ear—with slight deformity, it is true, which always follows when there is any positive destruction of the cartilage itself.

TRAUMATIC PARENCHYMATOUS KERATITIS.

BY THOS. M. STEWART, M. D., CINCINNATI, O.

THE following case is reported as containing some interesting features because of the apparent cause of the trouble.

The patient was a young man, aged twenty-five ; no history of any previous eye trouble ; and no history of any blood taint. He applied for treatment one month after having received a blow in the left eye from the switching of a horse's tail. The case was clearly one of parenchymatous keratitis, with a well-marked "salmon patch." The iris was sluggish, but the patient had no pain or other subjective symptom unusual to the form of trouble in question.

Internal remedies with atropia and yellow oxide locally—were employed. After beginning the use of the yellow oxide the case improved more rapidly. Including the month previous to applying for treatment, the duration of the disease was three months ; at the end of which time the cornea and other media were clear, save a few sclerosed spots which in no way interfered with vision.

Before discharging the case the patient was requested to report once again, and at the time he did so the right eye showed the same pathological condition as had been first seen in the left eye. No external cause was found, however, to have had any influence upon the right eye in a causative way. Duration of treatment for the right eye was two months, until the cornea was clear again.

The title of this paper was sent to the secretary of this society before the right eye became involved, and that

makes it all the more necessary for me to avoid writing upon another subject, as I had later wished to do.

Questions :

1. Is trauma to be considered as a causative factor in parenchymatous inflammation of the cornea?

2. May not the prompt response to the local use of mercury have depended upon its action on the wandering corneal cells, in view of the action of mercury on the lymphatic capillaries of the body and their contents?

THE DISEASES OF THE SINGING VOICE, THEIR CAUSE AND THEIR TREATMENT.*

BY PROFESSOR DR. H. KRAUSE, BERLIN.

THROUGH the indefatigable labors of Johannes, Mueller, Helmholtz, and Merkel we have the physiological foundations of our knowledge concerning the education of the singing voice; and through the researches of numerous followers like Rossbach, Aertel, Mackenzie, Techmer, Michael, Lermoyez, and others, they have been enlarged upon and enriched in many details. While we admire, in the great works of the earlier investigators, the depth and the skill in the knowledge and the imitation of nature,—as, for instance, the demonstration of the working of the larynx in resonance and voice culture, by Helmholtz, and appreciate the works of the following generation, we recognize the importance of the attained results, and praise them: still we wonder why for years these labors of the physiologists have not been followed by a progressive step in the domain of pathology of the voice.

It is true that Rossbach, in the title and the preface to his work, "Physiology and Pathology of the Human Voice," promised to add to his physiological essays other essays on pathology, but in spite of his complaints of the lack of correctness in our pathological description of the disturbances of the voice, he nevertheless has not fulfilled it. This seems to show a lack of general interest in this subject, or of musical knowledge in voice production among the medical profession. Without this knowledge,

* Essay read at the XII. International Medical Congress in Moscow, 1897.

however, there cannot be made a correct judgment of the complaints of the singers, neither can these same be understood, nor the mode of treatment ascertained. For in the case of singers therapeutic measures must not be limited to brush, knife, or electrode—this will be shown later on—but the singer must resort to gymnastics of the larynx and the organs of resonance, under close supervision of the physician. The few who have so far given this subject their attention seem to have used a combination of medico-scientific and voice-technical knowledge and are satisfied with the observed pathological facts. Their publications are mostly in connection with essays on other foreign subjects; and are therefore widely scattered over literature, being difficult to collect. Besides these there exist a few very valuable popular works by trustworthy authors, in which the subject, however, is (of course) treated only in a superficial manner. The stimulus which the committee of organization in Moscow has given to the laryngological section, in putting this subject on the platform, meets therefore with great approval. I accepted the invitation of the committee to read this paper with the understanding that I would restrict myself to my own personal observations, experiences, and opinions, fully knowing that these must have on one side partly a subjective color; on the other side it is impossible that they should even approximately exhaust the matter. Nevertheless, I believe that an exchange of opinion on personal observations would be most apt to ascertain our knowledge and ability in this important subject, and to give an impulse to make up the deficiencies in this branch.

Next to gestures and speech, always loftier in effect than the former, and often than the latter, the voice stands as one of the most powerful means which nature has given man to express his inner life. Like her two sisters, the voice, too, is capable of expressing the emotions of the soul to the highest degree. In the soul of the child the great effects of love, hatred, joy, grief, pain, compassion, veneration, disdain, are felt but superficially. Accordingly their

expression, through the actions, word, or tone is shown in a crude manner, and those grades which elevate and terrify, they are almost unknown yet to the child's soul. Only when passion is developed to its height, only when the actual or imagined intuitively felt emotions of the soul strike the innermost heart to its very depth, and can elate and torture it, then only will be produced the ability of the soul or the intellect to express them. If the voice is being used as a means of expression, it often requires studied preparation for utterance and thus obtains a stronger effect than common speech. On the other hand, voice cannot be considered as nature's gift to every human being, for there are persons who never feel the need to sing a tone. Like speech, voice-production also requires the use of a complicated mechanism, *i. e.*, the so-called musical ear, an accompanying action of the cerebrum, the lungs, the larynx, and resonance-tube. The latter begins close above the vocal cords, and therefore comprises the upper space of the larynx, the pharynx, mouth, posterior nares, and nasal-cavities. The resonance-tube gives to the tone the fullness, roundness, power, and beauty. This is accomplished, as Helmholtz explains in his "Theory of the Tone-sensations," through the resonating cavities having characteristic sounds, by which the sounds coming from the larynx are re-enforced. The vocal cords have already this advantage over all artificially made membranous tongues, in that the width of their slits, their tension, and even their form are capable of being voluntarily altered, and this done very quickly and with great precision. To which is added the very great variability of the resonance-cavities according to their form, their contents, the tension of their walls and their outward opening, for which reason there can be produced by them a much greater variety of sounds than by any artificial instrument. If now the sounds natural to the resonance-cavities are in secondary manner being produced by the tones coming from the larynx, both kinds of sounds unite and modify each other.

In order that all these healthy organs should work har-

moniously together, to begin with, it is necessary to have a certain gift and careful education and practice. But how much more difficult is the task of the singer, if one or several of these organs are diseased! And how often do we meet a diseased condition in these or more distant parts of the voice-apparatus. How many professional singers commence their exhausting life-task without consideration of their faulty general constitution of chronic chlorosis, of neurasthenia, or even disorders of special organic, *e. g.*, heart-trouble, bronchitis, etc.

We will now proceed to consider the *general* causes of the voice-disturbances.

One disease, chlorosis, which has the deepest consequences, should be given here the greatest attention. Being born on the soil of inherited feebleness, of scrofulosis, of bodily exhaustion caused by losses of blood, diseases of the stomach and the intestines, the heart and the blood vessels, infectious diseases, overexertion through bodily or mental work, sedentary life, insufficient nourishment, etc.,—it produces neurasthenia and debility, irritability, deficient resistance of the organs, catarrh in the different parts, but especially in those of the organs of respiration and voice. The female sex is especially subject to it and it becomes fatal to singers, in most cases, as soon as it is established permanently. It may do damage in two directions: 1st, in leading to catarrh, and in its course rapid fatigue, uncertainty (through the gathering of secretions), dullness of the voice, also to paresis of the muscles caused by serous transudation into the muscular tissues and atrophy of the same, or to disturbances in the nervous system; 2d, in causing frequent exhaustion, anæmia of the brain, low-spiritedness, lack of will-power and of such love for work and action, without which there can be no satisfactory rendition of music.

With regard to the *special* reasons which cause the loss of the singing voice; they may result from diseases (1) of the larynx, including innervation of the same; (2) of the trachea, the bronchia, and the lungs; (3) of those of the

pharynx and its adnexa ; (4) of those of the nose and its adnexa.

The larynx, the organ proper which produces the voice, but which, physiologically and pathologically, is dependent on the wind-pipe on the one hand, and on the resonance-pipe on the other, offers a great number and variety of bad influences on the singing voice. This wonderful action of the organ, in which the most tender emotions of the human soul are manifest, requires—in order that it may satisfy the senses and feelings of the listener with purity and perfection—it to be in perfect order. Even in a quite normal state of the larynx we notice great and striking differences as to the effect of the voice on the listener. In spite of complete purity of tone, the delivery of some singers appears to us hard, dry, cold; in short, incapable to awaken an echo in our feelings. Song, speaking in quite general terms, represents itself as expression in tones of the emotions which our soul is capable of; and it can therefore be considered as a deed, produced by the co-operation of our intellect, our artistic or æsthetic powers, and the peripheric end-organ, the wind-pipe, larynx, and resonance-tube. It is therefore clear that not only every continuous and permanently established defect, but also every transitory disturbance in one of the above named organs, will impair the joint action of the same and make the total effect of a vocal performance very questionable. This synergy is such an intimate one that we cannot understand the vocal function of the larynx and its impairments without at the same time considering its dynamic efforts as uninterruptedly dependent on intellect and artistic-æsthetic conception.

For, what is the cause of most of the permanent diseased conditions of the vocal-organ? It is this, that untrained singers, *i. e.*, such ones who have not yet sufficiently learned to supervise and measure the dynamic exercises of the larynx, urge upon this organ a labor which necessitates an inappropriate waste of strength, and consequently an irritation of the mucous membranes and overexertion of

the vocal muscles. Even trained singers often lack the intelligent control of their vocal-organs, either from lack of artistic feeling, or from having lost, more or less, the mastery over their vocal powers, caused by bodily or mental sufferings. The vocal peripheric organ, on the other hand, may be so constitutionally weak, that great intellectual conception and a strong emotional power of expression are lost by an insufficient execution of the larynx. Such conditions in themselves do not constitute a pathological change, they come within the limits of the normal voice and of its aptitude of expression and creativeness; but they constitute, however, the source of the pathological disturbances which gradually develop, and which often are due to the conflict between will and power. There are, undoubtedly, singers who are equipped from the start with such a sound musical conception and such healthy vocal-organs that they themselves are able without the expert guidance of the teacher to avoid fundamental (coarse) mistakes in tone production and delivery. But it is certain that the greater number of the singers, from the very beginning, require the conscientious and strict leadership of the teacher unless serious disturbances of the voice will soon manifest themselves.

Here would be the place to say a word concerning vocal instruction. Each human voice has its individuality. Tone-production, timbre (quality), resonance, and delivery do not repeat themselves in the same manner in two singers. This is a law which is confirmed here as well as in all exterior and interior manifestations of man. It is, therefore, the first and foremost task of every teacher, and especially the task of the singing-teacher, to individualize most carefully,—*i. e.*, to adapt his “school” and his “method” to the talents and the needs of the pupil. He has to examine carefully the compass, character, flexibility, and expression of each voice, and only after the thorough knowledge of all the qualities, to lay out his plans for education. He should not endeavor to introduce something foreign (into the voice) which, perhaps, appears to him as very desirable,

but only to develop to their full limits the vocal and expression (talents) powers which are intrusted to him, without forcing any arbitrary methods. He should neither force depth nor height; that means, he must not attempt to carry either beyond their natural boundaries, which it is not difficult to ascertain. He has to develop above all the full use of the resonance-tube, the particular sounds of which must be used to re-enforce, round out, and heighten the euphony of the laryngeal tones.

According to Helmholtz: "the *timbre* of the reeds = (vocal cords =) is changed by the resonance-tubes, which may receive a different width, length, and quality, because the overtones which correspond to the particular tones of the resonance-tube [the harmonic overtones] are re-enforced considerably and brought out by these." Free reeds, however, without resonance-tubes with the single primary tones which they produce passing immediately and unhindered (freely) into the surrounding air, always have a sharp, cutting, and rasping sound. By the aid of resonance in tone-production, the larynx is thus disburdened; *i. e.*, the action of the vocal cords is relieved from the force of the expiratory column of air; because the laryngeal tone, which has been re-enforced by the covibration of the resonance-tubes, is made to sound fuller and stronger with less exertion on the part of the larynx. This attainment includes, as already mentioned, respiration and its artistic use. Though I believe that in most cases the pupil is annoyed much more than necessary with the so-called breathing exercise and its importance, and that a correct training of the resonance produces the proper employment of respiration almost spontaneously, I nevertheless do not consider it superfluous here to draw attention to two points, which restrict the free, unhindered use of the respiratory current for singing purposes. The first point is concerning woman's traditional dress, which is thoroughly opposed to the natural form of the body, especially the injurious corset, which, also, in other respects, is so damaging for the female body. Be it only mentioned here that,

as a rule, it hinders the free respiration and ought to be replaced by the soft corset-waist, which does not constrict and confine the chest; and if permitted, it ought to be made as harmless as possible. Secondly, it is strictly to be enforced, that in singing the pupil should not breathe through the mouth, but through the nose. Many singers, who were in the habit of breathing through the mouth, being tempted to do so because it is open during the act of singing, have been astonished, after their attention had been directed to the advantages of nasal breathing, how much deeper their respiration has become and how much greater is the expansion of the chest.

Concerning the recent mentioned appropriate dress, one must say that in men often the unusually tight, stiff, and high collar is a hindrance in the development of the larynx, and it may even prevent the developed larynx attaining its full powers and cause overexertion. During change of voice and menstruation singing should be stopped (entirely). The above remarks are intended to give in a few words the essential and indispensable elementary principles for the training of the voice.

Now, how about our vocal teachers? If I may judge from my own professional and personal experiences, then I must say that the vocal instruction, except that given by small number of scientifically and æsthetically trained teachers, who enjoy rightfully a great reputation, is principally in the hands of inexperienced people who, as a rule, are not sufficiently educated for the responsibilities of their profession. As to theoretical knowledge of anatomy, physiology, and theory of tone production, their knowledge is almost nil, their ideas are often very incorrect, still more often most absurd, and almost mystical. Thus the one, in order to explain to the pupil the essentials of resonance in an unscientific manner, pretends that the voice comes from the back of the head; another one, to whom it may seem as if an elongated resonance-tube is very important, that it comes from the forehead; a third one teaches that it comes from the nose, and many more such

absurd conceptions. Another teacher who puts more stress on respiration, and is continually harping upon this, causes his pupils to make the most extraordinary distortions of the thorax and abdomen, in order to make, as he says, the respiration easy and flexible. One fanatic requires all the exercises to be continually on "*ii*," another persists until he had reduced to the faintest pianissimo the relaxation of the vocal cords in the musette voice, which seems to him necessary, and until the pupil, whose senses have become blunted through years of this pernicious habit, gets a shock to the very tips of his toes at every forte-tone. It is especially the females, whose tissues and organs are so much more delicate and offer less resistance, who are an easy prey of the ill consequences of a false treatment, causing fatigue (overtiredness) and overexertion of the voice. It is a common occurrence that the ignorant and inexperienced teacher is led to train a mezzo-soprano to a soprano or a baritone to a tenor—more rarely the opposite. Or he makes too great demands upon the capacities of the young organ which soon tire it out and make it diseased; for instance by endless exercises which last many hours a day and which are being performed by the young singer without supervision. If afterward the voice becomes dull, without brilliancy, not responsive in the medium and in the piano, the advice is, by no means to rest and consult a physician, but to "sing it out," as it is vulgarly expressed.

The physician in most cases will be denied by the fanatical lady teacher, a worn-out prima donna, who, of course, holds the physicians responsible for the early loss of her voice. And instead of drawing from her own premature failure the only correct conclusion,—that she has herself become a victim of the misuse of her voice,—the teacher obstinately refuses the assistance of the laryngologist; she bequeaths her own faults as a legacy to the new generation (when often enough the last scanty means of a family are sacrificed to the phantom of a brilliant singer).

In short, we encounter descriptions of incomprehensible and even ridiculous voice-methods, if we ask the ill-advised and incapacitated pupils for the causes of the oft irreparable damage to their voice. We find only a very few who choose to imitate a Garcia or a Stockhausen, men who, through their independent studies of the mechanism of the voice, have rendered great service to our science and are regarded as heroes of the theory of singing up to the present day.

Besides the preceding, as already said, I attribute a second, not unimportant source of pathological changes in the singer's larynx to improper methods of instruction. Such defective conditions can only gradually be remedied by the singing teacher obtaining more than empirically acquired technical knowledge. It is requisite that a teacher should possess, besides his musical accomplishments and technical skill, sufficient knowledge of anatomy and physiology of the vocal organ, and of the theory of tone production, that he may understand that a temporary, not to mention a permanent, disturbance of the voice is caused by changes in the tissues, which only the physician can recognize. This knowledge will furthermore give him the necessary ability to estimate the amount of training that the normal larynx is capable of. It would be advisable to make a certain academic training obligatory for vocal teachers, or a definite course in these branches should be incorporated in the musical conservatories. In this manner will it only be possible, in time, to rectify the pernicious work of these ignorant routinists, who are continually making victims.

From these secondary causes of vocal disturbance, which we have considered ætiologically, and to the description of which I have purposely devoted considerable space, let us now proceed to the immediate causes, the structural changes in larynx and resonance-tube; the most common form of which is a hyperæmia and thickening of the membrane. It is usually caused by abuse in the work of the voice-organ; occasionally also by acquired catarrh, or by

catarrh of the bronchia, nose, and pharynx, which have spread by contiguity to the larynx;—by the persistent exertion in spite of existing catarrh; or by smoking and excessive use of alcohol. It seems almost incomprehensible how little regard a majority of singers give to such indulgence, especially with stimulants. Forgetful that the vocal efforts make the greatest demands on the power of resistance of the phonatory organs, so that the overstraining of the same should be avoided as much as possible—they sit together, artist-fashion, conversing, smoking, and drinking until late in the night in smoky, ill-ventilated rooms. A great talent is often prematurely ruined here, and even the most brilliant powers are brought, long before their natural time, to a much too early decay. For, setting aside the immediate effect from alcohol and smoke on the membranes, and likewise—(to mention this in particular)—the very important mental effect on the artist; alcoholism causes, as it has been proved, sooner or later, deep-seated changes in the circulatory apparatus and thus also in the nutrition of the other tissues of the body. The yielding and the flexibility of the cartilages, which ought to be under command to a certain degree, is certainly one of the chief requisites of a voice well trained. This elasticity of the cartilages remains, however, only up to a certain age, which nevertheless is prolonged in the different individuals, but through intemperance it often gives way at a youthful age to a fatal increasing ossification which, joined to the changes which also take place in the membrane and the muscles, must disturb, in a most marked manner, the mastery of the singer over his voice.

In individual cases of hyperæmia there may occur, through sudden overexertion, hemorrhage in or under the membranes, in the muscles, and varicose enlargements of the vessels, which press toward the surface; when they become visible in either diffuse or discrete form, more or less extensive circumscribed angiomaticous formations appear. Such patients often complain of painful sensations while

singing, which they locate rather distinctly. In one such case, which I have described, I have obtained a permanent cure by cutting the varicose blood-vessel and making deep scarification through the membrane into the muscle-layer. The degree of voice disturbance in this disease is not great; there is a feeling of heaviness, slight pressure, easily being fatigued, and difficult intonation, sometimes detonation. If this lasts a long time, then catarrhal affections gradually produce deeper changes in the membrane, which becomes rough and uneven on the surface through epithelial denudation. In some places, especially the borders, it becomes thick; in others atrophic, and takes on a gray or slaty color.

The ventricular bands also take part in the state of atrophy, in a manner that the entrance to the sinus Morgagni often forms a broad slit, in which the membrane appears yellowish, or reddish-gray, and also discolored. Accompanying this condition, which shows at the same time an increased secretion of mucus, is a feeling of roughness, dryness, heaviness, and sudden fatigue; the quality often becomes rasping, nevertheless it is possible for singers with much experience and perfect technique to give superior performances. The ailments increase, however, as soon as pachydermia is added to the state just described. These, as a rule, first attack that portion of the interarytenoid space which are in contact or rub against each other during phonation. Consequently, one sees gray, thickish ridges (either so on one or both sides), which, coming from the processus vocales, ascend more or less high on the anterior surfaces of the arytenoids. Later on, the processus vocales participate in the ailment; the posterior wall is covered, almost equally, with a thick, roughened layer of epithelium, which sometimes grows into pointed promontories or warts, which form a mechanical hindrance to the closing of the glottis. Pachydermia is one of the most fatal diseases of the singer's larynx, depending in its development on the irritability of the mucous membrane of the upper air passages, as well as on the faults in vocal produc-

tion. Accompanying these there appears very early muscular paresis, which makes an exact and refined delivery impossible. But paresis can attack the larynx also independently, either through degenerative action in the muscle or through such degeneration in the peripheral ramifications of the motor nerves, when the voice has been forced continually or suddenly. The most moderate paresis, especially of the thyro-arytenoid, may be as fatal to the singer as the frequent slight inflammation of the mucous membrane seems insignificant to the non-professional. For, undoubtedly, setting aside the synergetic action of all the muscles of the larynx and estimating this portion alone, we find that the thyro-arytenoid is the most important voice muscle. It is this muscle which, through its contractions and the strength (which results therefrom) of its longitudinal and oblique-vertical fibers, which interlace, gives to the vocal cords the required resistance against the current of expiration, and this, in connection with the abdominal pressure, gives the desired grade of tension. Through this function it imparts to the vocal cords their ultimate capability of adaptation to the intentions of the singer. In order to comprehend it, we need only to think of the exceedingly rapid change of the vibrations and of the muscular contractions which accompany the same when we hear the tones of a trill of a cultivated singer. For each higher or lower tone there is required a different state of resistance of the vocal cord, and thus a most rapidly changing action of this important muscle, while at the same time the other synergical working muscles have charge of the coarser position and placing of the vocal cords. It is needless to say that I attribute no less significance to the paresis of the latter than to those of the former named muscles, forasmuch as the lessening of function in the one involves without further delay the same in the other muscles, on account of their necessarily co-operative action.

The treatment of pachyderia can only in very rare cases accomplish a radical cure. In those which already have more or less great warty protuberances on the pro-

cessus vocales or on the posterior wall, one sometimes succeeds in removing these warts so far that smooth surfaces appear in their place, which allow approximation with the required precision. In most cases, however, we have to limit ourselves to the strengthening of the voice again by rest and removal of the accompanying inflammation. When paresis has set in, it is usually treated successfully by means of endolaryngeal faradization and through certain gymnastic exercises of the muscles of the voice. Such exercises must, of course, be made with the use of all vocal-technical precautions and be supervised by the physician. Incidentally I would mention one fact, that it is not necessary or advisable for the singer to practice only the missing or false tones in order to regain their desired perfection—this former is usually practiced with more perseverance than success. The foundation of every voice always remains the piano and the medium, and the better the organ works in these positions,—*i. e.*, the greater mastery it regains over them,—the more capable it is, or will become, for greater accomplishments. The merit and the reputation of a vocal teacher depend in no small degree on the knowledge of these facts. But, like in all branches of our therapeutic knowledge, there is here also, unfortunately, only too often a limit to our work. In young and unabused organs we can, in removing the organic functional disturbances, with few exceptions, re-establish the full power of the voice and its stage capacity. Nevertheless, I consider it my duty to advise vocal students, who during their years of study have to fight essential ailments—though mostly in vain—to give up the idea of a stage career. The theatrical life makes such excessive demands on bodily and mental endurance that the difficulties of such a profession are immeasurably increased, if at the beginning there is not at least certainty of the vocal powers. In older, worn-out larynxes we often meet insurmountable difficulties. I remember a large number of once famous stage heroes in whose cases I was unable to restore their lost voice, even after the administration of the most careful and

minutely indicated treatment, accompanied by absolute vocal rest. The patients do not attain certain tone combinations, the tone breaks off, or it sounds dry, not beautiful, or even really false. The afflicted ones recognize it; they lose their technical confidence in themselves, and then the physician's skill is powerless. Such cases, which are described under the name of voice weakness—*phonasthenia*—exhibit no symptoms, or perhaps no characteristic symptoms, and one would be at a loss to give the reasons for a sudden fatigue or the abrupt breaking off of the voice in certain chords. As these mostly are worn-out or tired-out voices, it is not venturesome to suppose that we have to do with some latent process in the several muscles or groups of muscles, such as interstitial inflammation, or proliferation of the tissues, in consequence of which the synergy of the muscles suffers. Furthermore, sometimes psychological influences may be at fault, as I observed in a former basso of the Berlin opera, who, when he was careless and merry, easily overcame the hindrance, but, when depressed, always stumbled.

Another very frequent occurrence are singers' *nodules*. They occur almost exclusively in singers and have their origin very seldom in the misuse of the speaking voice. In order to ascertain this difference, one must avoid putting leading questions so that the patient might think he is presumed to be a professional singer. Very often he does not pretend to be able to sing, because many people with a light heart unconsciously sing or hum an accompaniment to their work, just as the Alpine shepherd certainly is not conscious of how many times he sends his shouts down the valley. Now, it is just this sort of non-artistic singing which on that account abuses the organ mercilessly, and which is the active cause of those harmful nodules, and an organ to which high vocal endowments is possible is often broken at the commencement, when the talent is recognized. The nodules represent pointed or round formations, which extend above the surface or beyond the border of the vocal cords. They consist in circumscribed thickenings of the

tissue, with nuclei surrounded with cystic spaces, and over the whole is spread a strongly pachydermic epithelial cover; frequently they contain capillary or highly engorged blood-vessels. It is believed that they cause absorption of the elastic tissue, in which they are imbedded, by pressure thereon. These little new formations are usually bilateral and symmetrically situated, they are mostly of irregular shape and are found more at the junction of the anterior and middle third of cord, less frequently between this point and the middle. They vary in size from that of the point of a pin to that of a millet seed. According to my observations they are oftener to be found in women than men. The disturbances which they cause are considerable. Here, one should not only bear in mind that they form a mechanical hindrance to the approximation of the vocal cords to each other; but one must also consider that they, being imbedded in the middle of the essentially elastic part of the vocal cord, and on account of their encroachment thereon destroying the elastic tissue, they cause an interruption of the continuity of this very tissue. Therefore they prevent the singing of the medium and soft and tender tones, permitting only the high forte tones to be sung in the chest-register with tolerable success; because in those the strong tension of the vocal cords and their borders almost obliterates the unevenness in the latter, making them harmless; only that such a forced voice often shows the trumpet-like character of which Helmholtz speaks. This indeed is the case only with very small nodules. In consequence of the overtension of the vocal cords, and the more and more indulged use of the chest-register, a number of other changes in the mucous membrane, the muscles, and the blood-vessels are soon added, and the voice fails in all registers.

The question of therapy is not easy to be answered, and depends upon the decision whether one should undertake the dissolution of the nodules or their surgical extirpation. Undoubtedly one succeeds, in the beginning of the disease, by employing enforced rest of the organ for months and by

appropriate treatment of the accompanying symptoms in making very small nodules disappear; but they are apt to return when the exercises are recommenced. Larger nodules cannot, as a rule, be cured without surgical treatment. But this is often a double-edged sword, for, if it does not succeed, it then destroys the last remnant of the voice, which would still be serviceable for certain coarser productions. The operative treatment of the nodules, in contrast with the other rather subtle surgical operations in the larynx, requires the very highest skill and precision on the part of the operator.

Other ills which can attack the larynx of the singer hardly offer anything characteristic in this respect and may be here passed over. New formations, motor or sensory neurosis, etc., seldom show symptoms which deviate from the usual observations. No wonder, however, that the excitable crowd of vocalists complain of the most varied sensations in the throat, and to be just, we cannot deny that anyone whose subsistence is dependent on such delicate and vulnerable formation has good reason to pay attention to the faintest sign of disturbance, and that he is easily tempted to worry and to fret.

With regard to paralysis of the vocal cords may be mentioned, what many authors repeat, that the immobility of a vocal cord in the median position does not prevent emission of the voice. I have made observations on paralytic cases, who, in spite of paralysis of both vocal cords, could, as they thought, sing with their former ability; and I have for several years treated a lamentable tabic vocal teacher, who suffered from paralysis of both lower limbs and of both vocal cords, and was totally blind, whose only pleasure in life was to give vocal instruction, and who was continually endeavoring to convince me that his voice had not changed at all. All these patients could not, however, stand the test of a somewhat thorough examination of the registers, of the more subtle passages and the piano. In tabetic patients we must, however, not overlook the fact that such paralyses are apt to come and go suddenly, before they establish themselves permanently. A lasting paralysis—

even in median position—undoubtedly impairs precise delivery.

As a curiosity I would still like to mention an observation in another direction, which I made many years ago in a young tenor from Koenigsberg. This gentleman showed in the place of the vocal cords two formations, which cannot be described other than two red fleshy growths, and these were his true vocal cords, which could not be changed in spite of the most radical treatment. And yet, scarcely ever have I heard tones sweeter, softer, and more charming, than from this singer, far above the average. This is a proof of how a high degree of genuine talent and perfect art can master apparently unsurmountable difficulties.

The diseases of the trachea, the bronchiæ, and the lungs affect voice-production only in a secondary manner; it is evident, however, that even the lighter grades of such affections must influence respiration and phonation. Nevertheless there are examples of vocalists, and a goodly number, too, who have for years continued to sing while afflicted with advanced tuberculosis of the lungs, though under painful difficulties, but withal without showing a very great decrease in their capacities on the stage.

The voice is also influenced in a secondary manner by pathological changes in the resonance cavities. It has been shown above that these cavities have their own sounds and that these show many differences, and that the form, the content, the tension of the walls and the outer opening of the cavities are as eminently changeable as it is required for tone-production. This shows that every deviation from the normal configuration, and especially inflammatory conditions, which accompany œdema, swelling, loosening of the tissue, suppuration, epithelial desquamation or ulceration, dryness, decrease of elasticity, hyperplastic thickening, formation of growths on the mucous membranes, muscular paresis, etc., are apt to modify the individual sounds of the resonance-tube and through these also the formation of the laryngeal tones. In a well-developed and fresh voice, which obeys all intentions easily and without pains, we usually find well-formed organs, the delight of the eye of

the physician, who seldom sees such perfect organs. The larynx presents forms harmoniously developed; the vocal cords differ in structure according to the particular voice, so that an experienced connoisseur may judge even from length, breadth, and thickness their quality; the edges always sharply cut and smooth, even, working exactly and vigorously, well approximating the arytenoid cartilages, forming with the cartilages of Santorini slender pyramids, with well-marked promontories at their anterior extremity. The ligamenta aryepiglottica form clean cuts upon which are situated, either more in the middle or sometimes nearer the arytenoid cartilages, the rounded process of the cartilage of Wrysburg, which may appear bent, almost resembling a crooked sword, but oftener quite straight; the epiglottis stands erect, its upper border bent over toward the back of the tongue, and the supraglottic space being roomy. The cavities of pharynx and mouth are wide, the hard and the soft palate are nicely vaulted and show on every side perfectly rounded lines; the latter is placed high, at a good distance from the posterior wall of the pharynx; the uvula, with its lower edge forming a circle, hangs down free between the velum and the back of the tongue, the pillars of the fauces rounded off with clear-cut edges; between them the tonsils, in their niche, surmount the *areus palatoglossi* only a little, the back of the tongue is flat, the rows of the teeth fit well upon each other, the postnasal cavities are ample, the entrances to the eustachian tubes are smoothly joined to the outer wall, the fornix is well-vaulted, the choana are well-arched and have a wide opening, the nares are free. Even moderate deviation from such an ideal anatomical construction, still within normal limits, causes an influence upon the quality and the timbre of the voice, which receives an incorrect overtone (through) if the epiglottis hangs over the glottis; if the upper space in the larynx is not normally roomy; if the soft palate hangs low; if the soft parts of the pharynx lie closer together, or if the back of the tongue is high-arched. But if the space is still more contracted through hypertrophy of the tonsils, or adenoid tissue, or the mucous membrane of the nose, the

resonance cavities partially or wholly lose their flexibility and the ability to instantaneously change the form and tension of their walls, according to necessity; then the sound-waves of the larynx, instead of spreading out unhindered, are broken and thrown back, and the resultant tone lacks the perfect harmony which is created through the simultaneous admixture of sounds and tones from the cavities, therefore the tone becomes feeble and dull, sounds hoarse and flat. The action of the larynx becomes then naturally more labored and the singer attempts to remove this hindrance by greater tension of the muscles of the larynx. The genuine musical artist is able to overcome the lack of enphony of tone surprisingly well, by adapting himself to the altered space-relations and hampered motion. If this diseased state lasts long, often the best voice gives out, while a less gifted one succumbs much earlier. We can best understand the modification of the voice caused by the restriction of the spaces in the resonating cavities, by giving as an example the "dead voice" first described by Welhelm Meyer; that is, the speaking voice which has been more or less robbed of its resonant tones by the presence of adenoid vegetations in the naso-pharyngeal space. The effect upon the speaking voice by glandular enlargements—which partially or wholly fill the cavity, making it unsuitable for its function—may also be done to the singing voice with the same fatal effect by hypertrophies or less marked disturbances in the mucous membrane of the other resonance cavities and the adjacent sinuses. A simple non-complicated rhinitis alone has often an alarming significance for the singer. As long as the nose remains free for respiration, the difficulties are not great. A disagreeable feeling of dryness and tension in the nose and pharynx impairs tone production, but can be conquered; some singers even pretending to be able to sing with more ease at the beginning of a cold, to explain which I am unable. If this state lasts long then purulent discharge sets in, or gathering of the secretions in naso-pharyngeal cavity, epithelial denudation, granulous or atrophic inflammation, hyperplastic thickening of the mucous membrane of the

nose and the pharynx and enlargement of the lymphatic glands of the tongue; then similar occurrences appear, like the enlargements in the post-nasal cavities. Then the voice at the same time gets a hollow or nasal character, which is always the case when through lack of resonance the sounds are accompanied by a larger number of unharmonic overtones, the larynx is easily fatigued and not infrequently pain is felt. The purulent inflammation of the accessory cavities and the nasal reflex neuroses are likewise to be mentioned as causes of disturbances among the vocal profession. I have seen a lady suffering with general neurasthenia and spasms of sneezing, caused by the contact of cartilagino-bony prominences of the septum with the hyperplastic mucous membrane of the turbinated body, which made singing very difficult for her, destroying all pleasure therein. A suitable general treatment and the removal of the protruding portion of cartilage cured her paroxysmal sneezing, and singing became her delight again.

Therapy of the diseased resonance cavities is similar to that used for non-vocalists, but the physician should never neglect to direct the attention of the singer to the connection of such ills with difficult voice-production. If the singers understood these facts, they would probably decide more quickly to have hypertrophied glands removed or an elongated uvula shortened, and in general to rectify any impediment to the normal activity of the vocal organs.

However, when considering these local disturbances, one must not forget the connection of the same with the fundamental ills which are rooted in the constitution and in the profession itself.

The preceding remarks should be regarded only as a kind of reconnoitering expedition in the vast domain which opens wide before us here. If I have succeeded in awakening more general interest in a few of the more important questions the aim of these lines is fulfilled. I intend later to give this matter, which has such a great significance for many, more complete consideration in a larger work.

ABSTRACTS FROM CURRENT LITERATURE.

Gould, Geo. M., A. M., M. D.—*Retinitis Pigmentosa Without the Characteristic Pigmentation.*—*British Med. Jour.*, October 16, 1897.

The following report of two cases of this rare condition is taken from a paper read before the Section of Ophthalmology, British Medical Society, at the annual meeting:

CASE 4733.—A young lady of twenty-six, a typewriter, and a very expert one, by profession, presented herself on May 1, 1897, complaining of headaches and obscure ocular and cerebral symptoms, apparently due to eye-strain. Under mydriasis I found her error of refraction to be :

R.—Sph. 0.37—cyl. 0.25—ax. $180^{\circ} = \frac{2}{3} 0$.

L.—Cyl. 0.37—ax. $180^{\circ} = \frac{2}{3} 0$.

There was no considerable heterophoria. The ophthalmoscopic examination was negative—that is, there was no pathological tissue change detected in the fundus. I did not suspect anything wrong, and therefore did not make inquiries as to symptoms which were at a later date elicited by questioning. I prescribed spectacles for near work. At a subsequent visit, in conducting the patient out of the office, I noticed a certain doubtfulness of stepping in the darker hallway, a sort of groping motion of the hands and feet that, had I been more busy or tired, less alert-minded, might have escaped my attention. Inquiry at once brought out the fact that for three years she had had difficulty in walking at night, and by further questioning her brothers and sister confirmed the statement. They had frequently noted her indecision and stumbling. By tests I found what I think is a significant sign or hint of the limitation of the visual field: the necessity of bowing the head well downward in darkened halls or at night, in walking over rough places, or in

beginning the ascent or descent of unfamiliar stairs. This device is required to bring the images from the periphery to the more central portions of the retina. The white fields are about half the normal extent ; those for the remaining colors are very small, extremely irregular in outline, and in relative order.

With aroused attention I now most carefully examined the ophthalmoscopic details of the periphery of the retina. They were such as to have been passed over in routine work, but with not a little difficulty I could now detect numberless obscure tiny dots, brownish or blackish, similar to those of a stippled engraving, closely strewn about the periphery ; sometimes they seemingly tended to a streamer-like or strand-like arrangement, but not in the faintest degree suggestive of the appearance of typical retinitis pigmentosa ; in no part of the fundus were there any pigment-heappings whatever, and all the vessels were without the least abnormal pigmentation. This punctate appearance, or microscopic stippling, was confined to the extreme periphery, ceasing gradually as one approached the equator.

This patient was not color-blind, although across the blind indentations of some of the color fields certain tints were not detectable until the traveler overlapped the white fixation spot. Even if there had been central color-blindness for these colors I do not think the patient, with both eyes open, would have failed to distinguish the tints accurately enough, either because of one field supplementing the other, or by the unconscious device of indirect fixation, so that the image would fall on some retinal tissue still normally responsive to the stimulus. It is interesting to note that in approaching the center of fixation the red and blue travelers were for 5° or 10° perceived as pink, or spotted, before the true tint was detected. Other parachromatisms were found in charting the fields. Of especial interest is the fact of the little island of preserved blue-response in the southeast portion of the right field separated from the central field by 10° or 15° of space insensitive to the color. Into this island a sharp angle of peninsular red extends.

The discovery of the true nature of the foregoing case, of course, moved me to secure examinations of this patient's relations, and I was able to do so in the cases of two brothers, one sister, and their mother. In one brother, and in the mother, inquiry, refraction, and ophthalmoscopic examination were negative,

except that in the sister there was an almost indistinguishable stippling of the retinal periphery, similar to that in her sister, but less distinct. The perimeter, however, showed normal fields. The pathological process was either incipient or had been checked prior to any involvement of the distinctive retinal function; and this was, at least, a suggestive fact to be borne in mind in the future. In one brother, however, I had the scientific delight of finding another case like that of the affected sister—a typical case of what, lacking a better name, we must at present paradoxically call retinitis pigmentosa without the characteristic pigment.

CASE 4809.—This patient, a brother of the patient whose case I have just described, is a strong healthy business man, aged twenty-nine, who, with the exception of night blindness, had never suspected anything abnormal as regards his eyes or vision, besides his ametropic error, measuring

R.—Sph. 0.25—cyl. 1.25 ax. $180^{\circ} = \frac{2}{3}0$.

L.— " 0.75— " 1.50 " $180^{\circ} = \frac{2}{3}0$?

He had, however, to bow his head to see the ground or floor at night, and his brothers and sisters, as well as himself, had been aware that for ten years he stumbled or was abnormally undecided and bothered in walking at night or in dimly lighted rooms. Even with perfect correcting lenses it is noticed that his 20-foot amblyopia is greater than the sister's, although his visual fields are far less abnormal and limited. He had the same stippling as the sister at the periphery of the retina, but, like her, there was not a pigment cluster or line so large as the smallest pin in the entire fundus. As in the sister's case, the vessels, disks, etc., were not abnormal. Both being blonds, the choroidal vessels were somewhat clearly visible.

Your own scientific and dramatic satisfaction can hardly equal mine in learning that, although the father of these children was free from the symptoms of the disease in question, his father, that is, the paternal grandfather of the two patients, had all his life decided and complete night blindness, and went entirely blind, not probably from cataract, at the age of seventy. When I asked the mother concerning the symptom, she remembered that her husband's father had to bow his head very low, when in doubt, to see the ground, stairs, etc. I am most sorry to add that this

man is now dead, and that no oculist ever examined his eyes. Whether his disease was with or without the characteristic pigmentation must remain a regrettable mystery. Under the circumstances there cannot be the slightest doubt that it was one or the other. The knowledge would help to determine two important questions—that relating to heredity, and that as to the essential identity of the disease.

I regret very much that it was impossible for me to measure the variation of the central and peripheral acuteness under diminished illumination. Being private patients their good-will was exhausted by the extended perimetric examinations, and I judged that these tests were of far more importance than those pertaining to the intensity of the retinal stimulation. There can be no doubt that, as in all such conditions, the law of greater contraction of the fields and lessened acuity would have followed the lowering of the illumination. In this connection one of the most suggestive interest is the case of Atwood, in which, with normal fields for full illumination, there was contraction under lowered illumination. I suspect, however, that perfectly normal and healthy eyes might exhibit this phenomenon more or less. It would seem to be a logical deduction from the known laws of light and sensation. If this is true, the initial stages of retinitis pigmentosa without pigmentation might naturally exhibit a disproportionally greater reduction both in acuity and contraction.

DEADY.

Sutcliff, E. H.—Extraordinary Acute Case of Graves' Disease.—*London Lancet*, March 12, 1898.

Woman, thirty-three years æt. Mother died of cancer, a sister had curvature of spine. Patient had had three severe confinements, which greatly depressed the tone of health. She had all the usual symptoms of the disease. Three weeks before death vomited everything; took no food, as rectal feeding was not allowed; could sip little water. Shortly after this persistent vomiting supervened, the pulse was 200, and a very troublesome and painful cough developed, and the pharyngeal and laryngeal muscles became paralyzed, causing choking from taking water. Patient died three months after first symptoms.

PALMER.

Coulter, J. H.—Practical versus Theoretical Tonsillectomy.—*Jour. Am. Med. Assoc.*, February 26, 1898.

He holds that hypertrophied tonsils are only a local evidence of

some 'general dyscrasia, and "tonsillotomy, no matter what the method employed, will not complete the cure." "A partial destruction of the gland cannot in any case accomplish all the possible good." "Ignipuncture leaves a rough and ragged surface and the capacity for the absorption of toxin is practically undiminished; it also leaves a portion of the tonsil to be absorbed or to act as a focus for future inflammations." Dr. Pyncheon's method is described. It is a thorough dissection of the tonsil with certain galvano-cautery knives of his own invention.

Juler, Henry E., F. R. C. S. Eng.—Syphilitic Diseases of the Eye and Its Appendages.—*London Lancet*, December 18, 1897.

The following interesting cases are taken from the Harveian lecture delivered by Mr. Juler before the Harveian Society, December 2, 9, and 16, 1897:

CASE I.—The patient, a young married woman, consulted me for inflamed eyes. The right eye had been inflamed for a fortnight; so far as she could tell, it had never been inflamed before. A peculiar striated condition of the cornea was seen, giving the cornea a diffuse cloudy appearance. The right vision was $\frac{6}{60}$ Sn. The left eye had been inflamed for two months, and the cornea presented punctate and striate opacities similar to, but more pronounced than, the right cornea. Iritis coexisted. The left eye could only dimly see fingers at one meter. There was a gumma of the periosteum at the left angle of the lower jaw. There was no history of syphilis, but she had been pregnant three times, the first two resulting in miscarriages, the third time she gave birth to a living child, at the time I saw her eleven months old only, but apparently quite a healthy bairn. Treated with atropine locally and iodide of potassium internally she soon improved, so that in April the right vision was $\frac{6}{24}$, the left vision was $\frac{6}{12}$ Sn., and the inflammatory symptoms had disappeared as well as the periosteal node on the interior maxilla.

I believe this case to have been one of keratitis punctata profunda of Mauthner, caused by acquired syphilis. It is interesting to note that the opacities showed distinct striations, an appearance especially drawn attention to by Morton in the case he published.

CASE II. Ulcer of conjunctiva, involving the sclera. The

patient, a man of advanced middle age, attended St. Mary's Hospital some five years ago, having a cutaneous ulcer just below the inner canthus of his right eye. It was as large, and even larger, than a sixpence. The pre-auricular or submaxillary glands were not enlarged. He was advised to come into the hospital, but, no bed being vacant, he went away. The ulcer was considered malignant. He applied some vaseline to the ulcer, and when he attended again it was decidedly smaller, 6mm. \times 6mm. There was considerable conjunctival inflammation below. On December 10 he attended with a perforating ulcer of his cornea and prolapse of the iris without any obvious cause. Also, a deep ulcer of ocular conjunctiva and sclera, at the bottom of which the uveal pigment could be seen. History of syphilis was imperfect. He had suffered from buboes. He was ordered a mercurial lotion for the eye and a mixture of iodide of potassium and bark. He came again on January 10, 1893—*i. e.*, a month later—and the cutaneous ulcer had almost disappeared, being now about 2 mm. in diameter and the scleral and corneal ulcers were quite healed.

The case following is an illustration of one of the instances of granuloma of the iris, not caused by syphilis.

CASE IV.—The patient when he came under my care had failure of vision in both eyes. Twelve months before he had noticed his sight dim and under the club medical officer he got quite well. In November, 1889, he had another attack of dimness and consulted his club medical officer again, but did not improve, so came to the Royal Westminster Ophthalmic Hospital. The condition of his eyes was as follows: the pupils were semi-dilated, there were keratitis punctata, slight circumcorneal redness, and vitreous opacities. His vision was reduced to recognizing large objects only; he could count fingers held up before him. The vision equaled $\frac{6}{60}$. Mercurial inunctions and atropine were prescribed, although there was no reason to suspect syphilis, either hereditary or acquired. Four days later it was noticed that there were small gelatinous-looking growths on the surface of both irides. Mercury and the drops were continued, and three months later there was marked improvement. The vision of the right eye equaled $\frac{6}{24}$ and that of the left eye $\frac{6}{36}$. He now had slight mercurial stomatitis, so the drug was discontinued for a fortnight, and chlorate of potash gargle was prescribed. The nodules were

also much smaller, and one had disappeared from the right eye. By June the nodules had all disappeared without leaving any trace behind. He had now ceased taking mercury for five weeks and was taking quinine. In September, 1890, the media were clear, but traces of keratitis punctata still persisted. The vision of the right eye equaled $\frac{6}{6}$ and Jaeger 1, and that of the left eye $\frac{6}{60}$; fingers could be counted at two meters. There were glaucoma, cupping of the disk, with atrophy of the optic nerve. There was no subsequent change when last seen in 1896, beyond the disappearance of the remaining dots on Descemet's membrane.

I have perfect confidence in this patient's statement with regard to syphilis, nor could I elicit any history of any constitutional complaint in his family likely to produce this trouble. He had never been abroad and was a healthy, robust-looking fellow.

DEADY.

Hall, Ernest, M. D.—Partial Resection of the Eyeball.—*Annals of Surgery*, May, 1898.

The writer believing the two danger points of the eye to be the ciliary body and the optic entrance, the latter being the medium of sympathetic transmission, considers that with these and the retina and vitreous removed, the parts remaining should be free from irritation and furnish a good movable stump for an artificial eye. Following out this idea, he has devised the operation below described :

Under complete anæsthesia, with speculum in place, the scissors are inserted about 2.5 mm. behind the sclero-corneal junction, sufficient to include the ciliary body, and complete section made, thus removing the whole front of the eyeball. The vitreous is then evacuated and the retina removed with the curette ; the hemorrhage here is usually profuse, but easily controlled by hot water and pressure. The speculum is then inserted within the ball, and thus made to hold both eyelids and edges of the sclerotic opening. The point of entrance of the optic nerve is then grasped with toothed forceps and the scissors are inserted as close to the nerve as possible, to avoid wounding the ciliary arteries, and a circular incision is made in sclerotic, freeing the optic nerve, which is then drawn forward and severed about 2.5 mm. from the sclerotic junction, thus removing a section of the optic nerve. A laryngeal head-mirror is useful here to concentrate the light within the sclerotic cavity. A piece of

gauze is inserted and the sclerotic and conjunctiva are closed vertically in order to give normal tension to the internal and external recti, as lateral motion is of greater importance than vertical. The after-treatment is simple, the gauze may be removed in twenty-four hours. The cavity fills with blood, which becomes partly organized, thus preventing complete collapse of the sclerotic. An artificial eye may be inserted within two weeks.

The resulting advantages alleged are greater prominence of artificial eye, perfect movement between thirty-five degrees laterally and twenty vertically, also diagonal movement, and retention of the normal secretion from the lachrymal ducts.

DEADY.

Orthoform.—*London Lancet*, April 8, 1898.

Four to 6 grams by injection, or 60 grams locally, can be used in one week without deleterious effect.

PALMER.

Hubbard, Thos.—**Angio-neurotic Œdema and Certain Vasomotor and Trophic Disturbances of the Mucous Membrane of the Respiratory Tract.**—*Annals Ot., Rhin. and Lar.*, November, 1897.

First speaks of angio-neurotic œdema and urticaria, similar conditions of the skin, which are so much better understood. The respiratory disturbances are: (a) reflex type; (b) vaso-motor rhinitis; (c) acute or periodical neurasthenia; (d) persistent neurasthenia; (e) auto-toxæmic. Under reflex type as sample is given case of hydrorrhœa caused by impacted cerumen; (b) is characterized by a persistent œdema, hydrorrhœa and stenosis usually following hay fever; (c) clinical case of lady, stenographer by trade, studying during evenings. Her neurasthenic condition first showed itself by daily attacks of hydrorrhœa, stenosis narium, etc., afterward these symptoms were supplanted by "intense congestive headache, impaired mentality, and great prostration"; (d) lady forty-four years æt., whose mother and brother suicided. Removal of uterine polypi was followed by vasomotor storms. Frequent asthma; pressure on fourth cervical vertibræ cause severe dyspnœa, introduction of nasal or aural speculum cause hydrorrhœa and swelling of turbinates; parotid and submaxillary glands unaccountably swell, as also the joints. The nasal symptoms are worse during hay-fever season and the asthma in winter. As a subdivision of this

he mentions *hydrorrhœa gestationis*, which name explains itself. The auto-toxæmic are those vaso-motor and trophic disturbances in the nose caused by the vicarious elimination of toxic or excretory products. Divided into two classes, (1) intestinal, (2) metabolic. Under this heading speaks of throat and nasal inflammation caused by disease of kidney, by elimination of uric acid per narium, also case of lithæmic origin. Nasal or laryngeal difficulties as sequelæ of infectious diseases come under this class. Differentiation of the several classes can rarely be sharply defined.

PALMER.

Augieras, Dr.—Microscopic Examination of Conjunctival Secretions.—*Journal of Eye, Ear, and Throat Diseases*, January, 1898.

As a result of microscopical investigation of conjunctival secretions the author presents the following *résumé*:

1. Microscopic examination, after staining, of the conjunctival secretion, is useful for the diagnosis of affections of the conjunctiva and cornea.

2. The presence of microbes is the rule in catarrhal conjunctivitis.

3. It is the exception in eczematous conjunctivitis.

4. In the conjunctival catarrh of the neonatus we find most frequently cocci and diplococci; in that of the adult, notably in chronic cases and acute attacks of chronic cases, we find most often the thick double bacillus.

5. Fibrinous appearance of the pus indicates an eczematous condition of the mucous membrane.

6. Eczematous secretions seem to be void of infectious qualities and unfavorable to the development of micro-organisms. In a word, they are bactericidal.

7. Absence of microbes from the secretion and fibrinous character of the pus are found also in severe ulcerous kerato-conjunctivitis of eczematous nature.

8. One sees in the pus of certain cases of infectious ulcer of the cornea small thin bacilli, deeply stained by methyl-violet, which are also found in the pus of certain dacryocystites.

9. Although it has not been absolutely, positively demonstrated that eczematous affections of the eye have an exclusively diathetic origin, it is very improbable that they have as a cause a local infection of the conjunctiva and cornea.

DEADY.

Collett, Mr. E. P.—Coryza, Apparently of Dental Origin.—*London Lancet*, January 1, 1898.

The patient, a physician, suffered from persistent coryza, principally unilateral, for three or four weeks. Examination demonstrated no physical cause except some stigmata on the middle turbinated bone associated with general vasomotor dilatation of membrane—neuralgic pain in temple, malar bone, and subsequently behind right ear, supervened. Local treatment of no avail. The writer found a periodontitis of first maxillary premolar, which he extracted—no pus evacuated. Neuralgia cured next day and the coryza in three.

PALMER.

Scheppegrell, W.—Use of Oil for the Destruction of Larvæ in the Nasal Chambers.—*Laryn.*, February, 1898.

He advises against the use of galvanic or faradic electricity as advocated by Voltolini (*Die Anwendung der Galvano-Kaustic*, Vienna, 1872), as the larvæ will stand a stronger current than the surrounding sensitive human tissues. The free application of some oil such as glymol, sweet oil, liquid vaseline, etc., to the entire naris, thereby completely surrounding the larvæ, kills them, and they fall out of the chamber. It suffocates larvæ, as they breathe "through an intricate system of tubes [pulmonary trachea] which open by pores [spiracula or stigmata] in sides of the body."

PALMER.

Hicquet.—Two Cases of Lupus of Nose Treated by X-Rays.—*Revue Int. de Laryng., Rhin., and Otol.*, December, 1897.

CLINICAL REPORT OF TWO CASES.

CASE I. Male, aged eighteen years. Daily exposures to rays made in the beginning, but at longer intervals afterward, for five minutes at a time. The condition showed improvement after the twelfth exposure. After each application was temporary blenorhea. There was not the slightest show of ulceration, but simply little induration when discharged. It was a clear case of lupus.

CASE II. Female, aged twelve years. Individual nodules of lupus were scattered over end of nose and left cheek adjacent. Septum was perforated. Fifty exposures of five minutes' duration made. The ulceration has cicatrized and the nodules vanishing.

In both cases the cathode rays were applied. In treatment of lupus of the larynx the author has not been so successful.

PALMER.

Hay Fever.—*Acidum succinicum crud.*, 3x trit., has been successfully employed in the alleviation or cure of hay fever.—*Medical Century*, June, 1898.

Operative Treatment of Cleft Palate.—Murray, surgeon to the Liverpool Infirmary for Children, strongly recommends closure of the palate in early infancy. A number of his most favorable results have been obtained in children whose ages varied from eight to eighteen months. Although the clefts involved the soft and part of the hard palate the operations were so successful that, when the children began to talk, it was quite impossible to detect from their speech that they had ever had cleft palates.—*Medical Century*, June, 1898.

Paterson, Donald R.—**The Supratonsillar Fossa and Its Affections.**—*Jour. Lar. Rhin. and Otol.*, April, 1898.

First described as an anatomical space by His in 1885. "If we carefully observe the anterior palatal arch (*arcus glosso-palatinus*) there may be seen a fold of mucous membrane arising from its free border and stretching backward to the tonsil, which it covers." It is triangular in shape and "to it His has given the name *plica triangularis*. At its apex it may be seen to blend with the arch and become lost in the velum palate; the base disappears in the structures at the root of the tongue, while the free edge may extend over the tonsil for a variable distance and even be closely adherent to the gland." "At the upper part of the tonsillar region—*interstitium interarcuarium* (His)—and immediately behind the plica, a probe, suitably curved, may be passed into a cavity which extends into the soft palate for a variable distance, and bears an important relation to the tonsil. This space has been termed by His the *supratonsillar fossa*." Then the embryology and the situation and relation of fossa with the surrounding parts, also its anomalies, are thoroughly given. Affections of this fossa are (1) Suppuration. May be caused by retention of tonsillar secretions from obstruction of outlet by adherence of plica to tonsil or insnaring and retention of food particles in fossa. *Leptothrix* may be lodged therein, continuing

suppuration and leading to attacks of pharyngo-mycosis. The salts of these secretions may crystallize, forming calculi. Free drainage is first principle of treatment. (2) Papilloma of the plica. "True papilloma of the plica are met with and constitute a large portion of the so-called papilloma of the tonsil." Probably the discharge from the fossa was cause of the growths. (3) Malignant. Record of one case, originating at the mouth of fossa. (4) Foreign bodies sometimes lodge in this fossa. PALMER.

Heiman.—Treatment of Otitic Complications.—
Annales des Mal. de L'Oreille, Vol. XXIII., No. 2.

The writer summarizes the following data for the treatment of complications of suppurative inflammation of the middle ear :

1. The vital complications of otorrhœa still suffer from many wants in diagnosis and treatment.
2. In purulent otitis media, if there is no retention of pus, and yet general symptoms exist, like fever, debility, etc., or local lesions in the cerebrum, opening the cranial cavity is indicated in addition to the perforation of the mastoid.
3. Opening the cranial cavity is indicated even in the cases in which the surgeon does not find there the morbid products he expects to discover ; furthermore, this operation diminishes the intracranial pressure as well as the conditions favoring the absorption of infectious elements.
4. When one suspects the existence of a thrombus in the lateral sinus, it becomes necessary to puncture and aspirate the contents of the sinus, after opening the skull cavity. This latter part of the operation is of very great importance in diagnosis, and decides in most cases the necessity of continuing the operation on the sinus.
5. Exploratory puncture and even incision of the sinus will not entail general infection if the operation is surrounded with aseptic precautions, and it is not, furthermore, injurious when infectious conditions already exist.
6. Clinically it is necessary to make a distinction between two forms of pyohemia, viz., that with thrombus and that without thrombosis of the sinus. For operative procedure, pyohemia with thrombus of the lateral sinus offers the most important consideration.
7. Thrombotic pyohemia arises usually from pyohemia without thrombosis. The two forms occur if the infectious sources in the organ of hearing, and especially those in the cranial cavity, are not removed promptly, and the absorption of these matters suppressed. The development of the two forms of

pychemia often dates from the moment when the absorption of the infectious masses begins. 8. Pyohemia without thrombosis generally terminates favorably under the application of a rational therapeusis, and sometimes even without treatment. 9. Pyohemia with thrombus generally ends in death. Prompt and efficient operative interference, however, saves a certain number of cases. 10. The selection of the time of operating in vital complications of purulent otitis, especially when symptoms of general infection arise, is often difficult. When the surgeon dare wait without disadvantage to the patient, it is better not to operate until he is assured in his diagnosis. DEADY.

Petersen, R. (Berlin).—Laryngoscopy in Children.—*Therap. Monat.*, March, 1898.

After discussing other authorities' methods to accomplish this difficult task he gives his own as follows. The tongue depressor is a modification of Bleyer's, about 5 mm. shorter and the corners more rounded and angle more obtuse. "The children were taken on the lap of the assistant, arms, legs, and head (slightly inclined backward) were fixed, exactly in the same position as in operation for adenoids, and then I tried to open the way through the teeth by means of the anterior hook. When the mouth is slightly opened, the hook is gently pressed backward along the tongue to its base and the ligamentum glossoepiglottica. It is pressed into the fossa epiglottica, and then the tongue is gently drawn forward and slightly upward. I now quickly introduce a laryngeal mirror and wait for the next inspiration." If this is unsuccessful, withdraw instrument and start over again. In this he has always succeeded in seeing at least half of the vocal cords. "If the epiglottis is too far over the glottis, the traction on the tongue must be increased; in this way, in most cases, the whole posterior half of the vocal cords is visible." PALMER.

Sendziak, Jno. (Warsaw).—Contribution to the Complications Following Extirpation of So-called Adenoid Vegetations.—*Jour. Lar., Rhin. and Otol.*, June, 1898.

Such are "(1) Affections of the middle ear (otitis media acuta) and its consequences, perforation of the middle ear, membrana

tympani, affections of the mastoid process, etc. (2) So-called follicula angina, or more correctly, acute lacuna tonsillitis. (3) Still more rare secondary hemorrhage. (Newcomb's case fatal.) (4) Impactions of fragments in air passages. (Helme's case.) "The author in about four hundred cases has seen the first twice, the second several times, the third once slightly. He then relates *in extenso* two cases of malaria as sequelæ. [But inasmuch as three other members of the same family, who were not operated upon, had it also, and all had recently come from a malarial district, it is difficult to see how the operation was responsible for this.—ED.] PALMER.

McKee, A. B.—Asepsis in Otology and Laryngology.
—*The Laryng.*, May, 1898.

"The following hints may be found of value. 1. To sterilize cutting instruments, place in a 2½ or 5 per cent. carbolic solution 15 or 20 minutes, then dip them for a few seconds into boiling water. 2. To sterilize tiles, trays, or dishes for instruments, pour over them a few drops of alcohol and ignite it. 3. To sterilize blunt instruments, pass them through a spirit lamp, which should be on every instrument table. 4. To sterilize catheters, antrum canulæ, etc., boil them for a few moments, in a porcelain-lined dish, such as is used for holding soap or nail brushes. 5. To sterilize cotton pledgets, dip the cotton around probe into a saturated carbolic solution of boric acid; ignite it, and allow it to burn a few seconds; extinguish before the cotton is charred. 6. Needles preserve in pure lysol." PALMER.

Knight, C. H.—A Case of Fatal Hemorrhage Following Adenectomy on a Hemophilic Child.—*The Lar.*, April, 1898. [A discussion at New York Academy of Medicine.]

On January 20 child presented, with usual symptoms of retro-nasal obstruction. Examination showed hypertrophy of lymphoid tissue in naso-pharynx. January 25, under ether, hypertrophy removed with Brandagee forceps, Gottstein curette, and finger nail, followed by usual hemorrhage, which ceased promptly. Two hours after operation hemorrhage occurred, which was temporarily controlled by packing naso-pharynx with cotton and anterior nares with iodoform gauze. It recovered in two hours. "The naso-pharynx was repacked with tampons soaked

in tanno-gallic-acid solution; the anterior nares were repacked as before. The patient was in a state of profound anæmia. Whisky and strychnine and normal salt solution were given subcutaneously, but enemata of this solution were repeatedly rejected. Supportive measures were continued throughout the 26th, and on 27th, at 1 P. M., a large clot of blood was vomited, a portion of which was evidently a cast of the intestine. At 3 P. M., all packing removed and the nasal chambers and naso-pharynx were washed out. No hemorrhage followed. At 9.30 P. M., oozing was reported, which was checked by fresh packings. At 6 P. M., January 28, fresh hemorrhage was again observed, which soaked through all subsequent packings until 11.30, when child died." In discussion Dr. Newcomb reported three cases of quite severe bleeding some hours after operation; one was fatal. Dr. Delevan reported a fatal case. In all, there are on record seven fatal cases of hemorrhage following adenectomy.

Peyrissac.—Foreign Body in the Air Passages. Expulsion without Tracheotomy after Intra-tracheal Injections of Cold Water.—*Jour. Lar., Rhin. and Otol.*, May, 1898.

A boy, eighteen years æt., drew a prune stone into left bronchia during sleep, which remained twelve days, causing pain and dyspnœa. Before performing tracheotomy the author injected two cubic centimeters of cold water, to try the effects of reflex coughing. After a few seconds the stone, embedded in mucopurulent secretion, was expelled. No sequelæ. PALMER.

Woodward, J. H., M. D.—A Case of Pulsating Exophthalmos.—Rupture of the Left Carotid Artery into the Cavernous Sinus. Cured.—*New York Medical Journal*, June 11, 1898.

Patient, Mrs. M., thirty-nine years of age. First seen November 23, 1893. She stated that in May, 1893, after working hard all day, she had noticed a noise like the puffing of a locomotive at a considerable distance. She was standing in her doorway at the time and supposed that it was a locomotive that she heard. Very soon, however, she discovered that the noise was in her head. Since then it had been continuous, and it had become very distressing, especially at night. Not long after the noise began she

noticed that her left eye was becoming more prominent than the right. She had not noticed any double vision. In September, 1893, the vision of her left eye became less acute than it had formerly been.

Her mother had died of some affection of the lungs; her father was still living. She had had seven children, of whom five were still living and in good health. The youngest child was five years old. From her replies to my questions, and from my examinations of the patient, I was not able to detect that she was suffering from any constitutional dyscrasia whatever. Her heart and the blood-vessels were normal. Her pulse was full and strong and regular. She was well nourished. Her skin was somewhat bronzed.

She complained of a continuous noise in her head, which annoyed her very greatly. Her left eyeball was displaced forward, downward, and outward. This exophthalmos was very marked, but the patient was still able to close her eye completely. She did not complain of pain in the eye or its vicinity. The veins of the left superior eyelid were dilated, and those of the bulbar conjunctiva were engorged with blood. A slight exfoliation of the epithelium of the cornea had occurred, and the consequent failure in the transparency of that structure rendered it impossible for me to make a satisfactory ophthalmoscopic examination at that time. The pupil was normal. The movements of the eyeball were restricted in every direction. The supraorbital and the infraorbital blood vessels were greatly dilated, and in these, especially in the supraorbital vessels, an aneurysmal thrill was distinctly perceptible. On applying the stethoscope above the eyeball, an aneurysmal bruit was very plainly heard, and also, from time to time, the *bruit de piaulement*. The aneurysmal bruit could be heard also above the *right* eye. Compression of the left common carotid artery checked the pulsations and put an end to the noises.

Rest in bed, occlusion of affected eye and iod. potass. cleared up the cornea so that ophthalmoscopic examination could be made, which revealed dilated and tortuous retinal veins and several small hemorrhages. No retinal pulsation. Tension normal. $V. = \frac{5}{30}$.

December, 11, 1893, common carotid, left side, was ligated, with relief of all symptoms, but not total abolition. A few

months later the patient was again examined and was still suffering from noises in head produced by the aneurysmal souffle and bruit, which she was able to control by pressure on the arteries of the collateral circulation at the root of the nose. For this reason these vessels were then ligated, with the result of a removal of all the disagreeable symptoms and a complete cure, vision returning to the normal.

DEADY.

Lack, Lambert (London).—A Case of Pharyngeal Nystagmus, with Remarks on Similar Affections of the Pharynx and Larynx.—*The Laryng.*, June, 1898.

This is a symptom rather than a disease. It was a remarkably rapid rhythmical twitching of the posterior pharyngeal wall, about 150 per minute. It affected the superior and middle pharyngeal constrictors. Cocainization of nose or pharynx had no effect. During phonation the arytenoids were steady, but jerky during normal respiration. Occasional rapid tremor of upper lip. Not hysterical, and no history of chorea or rheumatism. A post-nasal catarrh with crusts existed. The author, on examining the literature, found ten cases recorded, and some others of a choreic nature. "Reviewing them, we find they come naturally in two groups: (1) Those in which the pharyngeal and laryngeal movements were associated with and presumably due to severe nervous lesions, such as cerebral tumors, meningitis, tabes dorsalis, trauma of spinal accessory, etc. (2) Case in which the soft palate or some of its muscles were affected and in which the movements were apparently excited reflexly by some local catarrhal condition, nasal polypi or turbinated hypertrophy, adherent crusts, etc." Upon curing the catarrh the nystagmus ceased.

PALMER.

Carnot, Paul.—Gelatin as a Hemostatic.—*Am. Med. and Surg. Bul.*, January, 1898.

In epistaxis, metrorrhagia, wounds, and surgical operations, this is a good local hemostatic. Use a 5 or 10 per cent. solution in a sterilized saline solution—warm and not hot. To stop epistaxis syringe the nose with 8 or 10 drams, and then pack with cotton saturated in same solution.

BOOK REVIEWS.

TRANSACTIONS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM. Vol. xvii. Session 1896-97, with list of Officers, Members, etc. London: J. & A. Churchill, 7 Great Marlborough Street, 1897.

In this volume will be found many interesting cases, and as it embodies the experience of the best English ophthalmologists, some of the matter may be of interest.

Dr. J. W. H. Eyre furnishes an article on tubercular conjunctivitis, comprising his personal observations on the subject.

He has found a total of eight cases out of twenty-five thousand new ophthalmic cases seen since 1893. He finds the tubercle bacilli in sections of the diseased conjunctiva either singly or in groups of three or four, and but rarely in larger clumps of ten, twenty, or thirty. They are scattered throughout the tissues and bear no constant relationship to the giant-cells. Contrary to the experience of some observers, he has been unable to find the bacilli in the conjunctival secretion.

In the majority of cases he regards the presence of the disease as a local manifestation of infection, due to the introduction of tuberculous material into the tissue of the conjunctiva at the site of abrasions,—broken-down phlyctenulæ or other ulcerations,—as the most careful and thorough examination fails to show evidence of tubercle elsewhere. The age limit is wide, the youngest case recorded being an infant of ten months; the oldest, a man of thirty years. The majority of cases, however occur between the ages of ten and twenty, especially at or about puberty.

Females are slightly more liable, in the proportion of 1.5 to 1.

The site of the disease is much more often the palpebral conjunctiva than the bulbar, and the lower rather than the upper lid. It is more commonly unilateral and the cornea is often affected, the condition being superficial keratitis, sometimes with iritis.

The preauricular gland of the affected side is usually swollen, firm, and tender ; often painful. As a rule it does not suppurate. For treatment he advises the early and complete removal of the affected tissue whenever possible.

Dr. Arthur Sandford cites cases of corneal ulceration in which, after other forms of treatment had proved ineffectual, speedy recovery was induced by the direct application of oxygen gas to the affected eye by means of a rubber cap so adjusted that the gas could be kept in contact with the diseased surface. Marked improvement occurred within twenty-four hours.

Mr. Thos. H. Bickerton reports a case of spontaneous complete luxation of the lens in its capsule into the anterior chamber.

The patient was a woman of good habits and absolutely denied tranumatism, either recent or remote. She stated that before the occurrence of the dislocation (seventeen days before presenting for treatment) the sight of the eye was as good as usual. She was suddenly seized with giddiness, sat down, and found herself blind. On looking at the sky it appeared a dull red. A moment or two after vision was entirely lost.

Vision was found to be nil. Tension stony, hard. No ocular congestion ; cornea clear. Anterior chamber occupied by a large and complete lens, which was undergoing irregular cataractous changes. Iris and pupil not visible.

The lens was removed through a cataract incision and healing was excellent ; vision, however, remained nil.

Mr. John Griffith records a case of *retinitis punctata albescens*. Patient a male, æt. forty-six, silversmith, presented for treatment, complaining of night blindness. Said he had suffered from it all his life, no venereal history. Parents were first cousins. His sister also suffers from night blindness. She is married to a first cousin, but her son has good sight. Status præsens : $V. = \frac{6}{36}$, not improved by glasses. Marked deficiency in light sense. Fields normal for white and for colors in good light ; slightest shadow reduces color field markedly ; color vision normal, no scotoma. Disks pale, somewhat waxy. Margins gradually shading off into the color of the fundus. Vessels slightly constricted. There is a general mottled condition of the whole fundus, but especially around the disk and macular region there is a ring area covered with discrete yellow spots.

This is apparently a well-marked case of this rare disease.

Messrs. Lang and Thompson report a case of enophthalmos which becomes exophthalmos on stooping or on compression of the jugular vein.

Patient, female æt. twenty. In the erect position the left eyeball is somewhat retracted, but on stooping, or on compression of the jugular vein, becomes very rapidly proptosed. Condition has existed from childhood, and there is no history of traumatism. At times the proptosis is accompanied by very considerable pain.

Vision : O. D. $\frac{6}{6}$, J. 1. ; O. S., $\frac{6}{60}$, but reduced to barely counting fingers in the proptosed condition.

In July, 1893, when patient was first seen the condition of the left eye is recorded as optic neuritis. At present the disk is atrophic. There is no bruit. There are no visible varicose veins elsewhere ; when the patient brings on the proptosis herself it soon subsides, but when it comes on spontaneously it usually does not disappear for a long time.

An article by Mr. F. R. Cross, on "Some Cases of Sympathetic Ophthalmia," referred to three cases of this disease following the insertion of a glass vitreous body ; the Mules' procedure. The author contended that this operation was not so safe as enucleation, and considerable discussion resulted. Mr. Adams Frost and Mr. Bickerton both claimed to have done a large number of Mules' operations, and considered that sympathetic disease was no more common as a result than after enucleation. Mr. Critchett, Dr. Argyll Robertson, and the President (Mr. Swanzy) were evidently inclined to consider enucleation the safer practice, as each of them had made a very large number of enucleations with only one or two cases of sympathetic disease as a sequence.

The volume also contains a very interesting discussion on retro-ocular neuritis, which fills about one hundred pages, numerous cases being cited and analyzed.

A HANDBOOK OF MEDICAL CLIMATOLOGY. Embodying Its Principles and Therapeutic Application, with Scientific Data of the Chief Health Resorts of the World. By S. EDWIN SOLLY, M. D., M. R. C. S., Late President of the American Climatological Association. Illustrated in black and colors. Lea Bros & Co., Philadelphia and New York.

This work, of nearly five hundred pages, is the most complete on the subject treated that we have had the pleasure of perusing. It considers Climatology in a methodical, thorough, and scientific

manner, while at the same time the phraseology is more readable and interesting than the average medical book.

Its completeness may be judged by the full way in which it considers in the first chapter of Section I., the "Physic" of Climatology, to wit, earth, air, sunlight, temperature, and electricity. One-fifth of the work is given to these fundamental principles, while another is occupied by an exhaustive consideration of the effects of certain climates on the different forms of Phthisis, including a Table showing Reported Results of Climatic changes on 7795 Cases of Phthisis. Then other diseases than the former, which are beneficially affected by special climatic influences, are dealt with.

Finally, about half of the book is occupied by a description of the individual health resorts of the world, with special attention to those of our own country. For example, under the heading of the Pacific Coast Region of the United States, the springs mentioned are—the Doolan Vichy; Geysers of California; Harbin Hot, Sulphurous, and Saline; Anderson's Mineral; California Seltzer; Napa Soda; Bryon; Azula or Blue; Paraiso Hot; Springs of El Paso Robles; Fulton Artesian Wells; Arrow Head Hot; Palm; Corral de Luz Hot; Aguas Calientes; Coronado; Canelias Hot and Cold; Summit Soda; and several others, which as yet have received no particular name. A paragraph about each spring gives its locality, atmospheric temperature, and humidity, the ingredients and temperature of the water, etc.

MASTOID ABSCESSSES AND THEIR TREATMENT. By A. BROCA, M. D., Chirurgien des Hôpitaux de Paris, Professeur Agrégé à la Faculté de Médecine, Membre de la Société de Chirurgie, and F. LUBET-BARBON, M. D., Ancien Interne des Hôpitaux de Paris. Translated and Edited from the French, by HENRY J. CURTIS, B. S. and M. D., Lond., F. R. C. S. Eng.; Assistant to the Professor of Pathology, University College; Assistant in the Ear and Throat Department, University College Hospital, London. With Eleven Colored Illustrations. London: H. K. Lewis, 136 Gower Street, W. C. 1897.

This book is the English translation of the paper which was awarded the Prix Meynot by the French Academy of Medicine in 1894, and is a thoroughly scientific exposition of the subject as at present understood. The peculiarities of each variety of the disease are described and illustrated by the histories of cases which have been treated. Of these there are reported 129,

embracing almost all the known lesions. The pathology, symptoms, methods of treatment, and results are concisely given, and plates, showing the temperature charts in different forms of disease, are interspersed through the text. Excellent colored plates of the topographical anatomy of the parts precede the letterpress, which begins with a sketch of the pathological anatomy and physiology. The operative treatment is well described, and many valuable hints may be gleaned from the volume, which is in every way excellent.

THE DISEASES AND INJURIES OF THE CONJUNCTIVA, ESPECIALLY THE SO-CALLED GRANULATED LIDS. By JNO. H. THOMPSON, M. D., Professor of Ophthalmology and Otology, Kansas City Medical College, Kansas City, Mo. First Edition, with Illustrations. Kansas City, Mo.: Hudson-Kimberly Publishing Co., 1014-1016 Wyandotte Street. 1897. Pp. 216.

This book is intended for students and general practitioners, and as such it is a very fair presentation of the subject. While we may differ with the writer in some points of pathology, his general description of the diseases considered is lucid enough and sufficient to give to the reader a good idea of the various affections of the conjunctiva. There are a few points, however, relating particularly to the treatment in which we fail to follow him. Thus, under gonorrheal conjunctivitis he says the prognosis is bad, and under the treatment he recommends it is often so, although we are aware that his treatment is as good as any that is usually given in these cases.

He says the eye should be cleansed every two hours; we would amend by making it every fifteen minutes while the discharge is free, and at all times often enough to keep the eye free from pus. He says when the acute stage is over, and not before, a solution of nitrate of silver of 10 grs. to the ounce should be used on the inner surface of the lids and then washed off with plain, not salt, water. If he will begin as soon as he gets the case and use once daily a solution, not of 10 grs. but of 30-40 grs. to the ounce and wash it off not with plain, but with salt, water, he will probably revise his prognosis. He is willing, in some cases of conjunctivitis purulenta neonatorum, to use the silver nitrate as strong as 20 grs. to the ounce on the delicate conjunctival membrane of the infant; why not upon the adult with precisely the same condition?

The writer began using the strong solutions of silver nitrate

upon these cases in the wards of the New York Ophthalmic Hospital nearly twenty years ago, and the success was so excellent that it has been generally adopted by the staff, with the result that we have hardly any of the dread of these cases that formerly obtained, provided the cleanliness is absolute and the iced compresses are properly cared for.

We have seldom had serious affection of the cornea, which can many times be stopped in its incipency by frequent doses of hypophosphites of lime, and we have never cut the external canthus, and never scarified the conjunctiva.

Again, in speaking of granular lids, the author advises the use of sulphate of copper, and on page 127 says that "it is probable that the use of a mild solution of corrosive sublimate has an inhibitory influence on the growth of micro-organisms," but that only strong solutions will kill them, and that it is not safe to use the mercury in solutions stronger than $\frac{1}{2000}$, for fear of necrosis of the tissues.

We commonly use the bichloride in this disease in a solution of $\frac{1}{1000}$, not dropped in the eye, but rubbed on the palpebral conjunctiva with a cotton pledget and fairly well rubbed, too. In some cases we have used it as strong as $\frac{1}{500}$.

If the application is preceded by cocaine the reaction is not excessive, and in many cases the results far surpass those obtained by any other treatment; no bad results have ever been seen. We hope the author will pardon this well-meant criticism, and if he will try the treatment spoken of, unless the diseases mentioned are very different in the West from the same conditions in New York, which we doubt, he may derive some benefit therefrom.

RETINOSCOPY IN THE DETERMINATION OF REFRACTION AT ONE METER DISTANCE, WITH THE PLANE MIRROR. By JAMES THORINGTON, M. D., Adjunct Professor of Diseases of the Eye in the Philadelphia Polyclinic and College for Graduates in Medicine, etc., etc. Second edition, revised and enlarged. Thirty-eight illustrations, twelve of which are colored. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street. 1898. pp. 72.

Of this little book we can only reiterate our opinion, as given in the review of the first edition. It is the most concise, practical, forcible, and altogether excellent presentation of the subject that has ever been written. It aims to furnish the beginner with the necessary information on the subject in the fewest possible words, avoiding theory and confining itself to categorical state-

ments of facts, and it accomplishes this end absolutely and thoroughly. This, the second edition, has been revised, slightly enlarged, and contains a number of new illustrations, some of which are in colors.

TECHNIQUE OPHTHALMOLOGIQUE, ANESTHÉSIE, ANTISEPSIE ET INSTRUMENTS DE CHIRURGIE OCULAIRE. Par le Dr. ALBERT TERTON, Chef de Clinique Ophtalmogique à la Faculté de Médecine de Paris ; Lauriat de l'Académie, de la Faculté de Médecine et des Hôpitaux ; Secrétaire de la Société d'Ophtalmologique de Paris. Avec 93 figures intercalées dans le texte. Paris : Librairie J. B. Baillière et Fils. 1898. Pp. 208.

In this little volume we have a complete exposition of the most accepted methods of preparation for operations upon the eye ; the indications for and against the various methods of local and general anæsthesia, the technique of the local and general asepsis necessary or advisable in ophthalmic surgery ; with special directions for preparations of the subject for the different operative procedures upon the lids, bulbus, conjunctiva, cornea, etc., etc.; including a full description of all the instruments used, most of which are illustrated by woodcuts and serve to give us a good idea of the special adaptations in the instrumental line introduced by some of the most prominent French operators. Directions are also given for the care and sterilization of all instruments, bandages, and other accessories; the whole making a very complete little text-book on the technique of ophthalmic surgery as understood at the present time.

The following works have been received and will be reviewed in the October issue:

SYSTEM OF DISEASES OF THE EYE, BY AMERICAN, BRITISH, DUTCH, FRENCH, GERMAN, AND SPANISH AUTHORS. Edited by WM. F. NORRIS, A. M., M. D. and CHARLES A. OLIVER, A. M., M. D., Philadelphia, Pa. Volume III. Local Diseases, Glaucoma, Wounds, and Injuries, Operations. With 50 full-page plate and 186 text illustrations. Philadelphia : J. B. Lippincott Company. 1898.

ELECTRICITY IN THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE NOSE, THROAT, AND EAR. With 161 illustrations. By W. SCHEPPEGRELL, M. D., New Orleans, La. G. P. Putnam's Sons, New York and London. 1898.

HAY FEVER AND ITS SUCCESSFUL TREATMENT. By W. C. HOLLOPETER, M. D. Philadelphia : P. Blakiston's Son & Co., 1012 Walnut Street. 1898.

THE JOURNAL OF OPHTHALMOLOGY, OTOLOGY AND LARYNGOLOGY.

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EPILEPSY AN OCULAR REFLEX.

BY EDMUND T. ALLEN, M. D., PH. D., CHICAGO, ILL.

EPILEPSY is a disease characterized by recurring attacks of unconsciousness, attended with convulsions. It is one of the most important and mysterious affections of the nervous system. It robs its victims of peace, joy, and reason. It is dreadful in its manifestations, and often hopeless in its prognosis.

Epilepsy has no constant pathology so far as altered structures are concerned. The origin of the disease has long been wrapped in obscurity. Many authors have claimed that it originates in the medulla oblongata, because an irritation of that part will produce spasmodic affections, but the lack of constant structural change in the medulla has led others to seek the ultimate cause of said irritation elsewhere.

De Costa states that the disease may be either central or peripheral, giving as centric causes tumors of the brain, syphilitic affections of the meninges, or disease of the skull cap; but he admits that these irritants are much less frequent than reflexes from congenital phymosis or disease of other remote parts.

Brown-Sequard taught that epilepsy might be centripetal, starting from any part of the skin or end organs, and its point of departure detected by the violence of the contractions in the neighborhood of its origin.

Dr. Stevens of New York was perhaps one of the first to call the attention of the profession to the eye as the most frequent seat of the original disturbance, and for his temerity he was subjected to most unjust criticism. He showed that of one hundred consecutive cases of epilepsy examined, only eighteen had a refractive error of less than one dioptré; and of these eighteen, four suffered from atrophy of one eyeball.

Mr. Dodd of England made a very superficial examination of one hundred cases, not testing the muscular condition at all, but, as the result of his investigation, even he declared the correction of the refraction to be of "some value" in the treatment of the disease.

Dr. Ranney claims that a muscular unbalance of the eyes is of even more importance than a refractive error. Of twenty-six cases of epilepsy examined by him, not one had orthophoria, or a perfect balance of the ocular muscles, whereas four were free from all errors of refraction.

It is of the greatest practical importance, both to the patient and to the physician, to determine this matter of causation. For if all the causes of any nervous affection be removed, nature will, in nine cases out of ten, put an end to the trouble. Hence, in each individual case every possible source of irritation should be investigated and, if possible, removed, and very thankful should we be that it is possible with modern methods to discover these centers of reflex trouble.

First, then, the fact that in the interval between the seizures perfect health is often observed, leads to the belief that epilepsy is not due to an organic lesion of the cerebro-spinal nervous system. The gradual failure of intellectual power is undoubtedly the result of the epilepsy (or of the bromides taken to suppress it) and not its cause. Even the structural changes occasionally found after death in epileptic persons may have been consequent upon the disease and not antecedent to it. If further proof were necessary that the disease is not central it can be furnished by the frequent cures which are being made to-day

simply by removing various sources of irritation, and again by the return of the seizures if the same exciting causes are again allowed to become operative.

To illustrate: An epileptic who was wearing a strong prism for the correction of hyperphoria (a tendency of one eye to turn upward) was persuaded to discard his glasses for an evening reception. The first seizure he had experienced in several months came on at once.

Another who had gone for over a year without a convulsion had one within an hour after a strong cylindrical glass was improperly replaced after it had fallen out. This test of the efficiency of the treatment is most conclusive. Hence, very much depends upon the accuracy of the ætiological diagnosis.

Sources of reflex trouble other than the eyes undoubtedly exist in many cases, but in very few of them would there be an epileptic manifestation were it not for an hereditary ocular defect. Any trifling external irritation acting upon such a nervous condition already weakened by eyestrain produces the paroxysm. For the exciting causes are rightly regarded as inefficient to produce epilepsy unless there be a constitutional predisposition to the malady.

An objection which has been urged to the theory that epilepsy originates in eye difficulties is the fact that the tendency to it is hereditary.

Exactly; and there is just the point. Most epileptics are born of parents subject either to some spasmodic affection or to a debilitated condition.

But, as Stevens has well pointed out, this inheritance is a tendency and not the disease itself. It is not a spiritual essence which passes from parent to child, but "a physical cause obeying physical laws," and a most important element thereof is to be found in an inherited faulty construction of the eyes and of their muscles.

If the exciting causes are detected they should be at once removed. No one will attempt to dispute this. Why,

then, should not the predisposing causes also be sought out and, if possible, removed?

One will say that an hereditary predisposition cannot be removed without going back to a time anterior to birth. The modern Nicodemus finds the physical regeneration as difficult to comprehend as did his prototype in the spiritual realm.

It may be granted that the development of a child's physique, as well as his education, should begin with his great-grandparents. But given the child of to-day, with all his inherited structural defects, as we find him, must he continue to suffer simply because these defects are inherited? By no means. Yet such is the flimsy defense from behind which the opponents of ocular reflexes shoot their arrows of ridicule.

If eyestrain be a cause of epilepsy, the removal of the eyestrain by glasses or tenotomies ought to be followed by relief of the epilepsy. To show that this has been the experience of many skilled operators, I need but quote a few of our most eminent authorities.

Of twenty-nine cases of epilepsy treated for muscular trouble by Dr. Stevens fourteen were cured, five still being treated were helped, one died, seven were helped temporarily, and only two showed no improvement.

In Dr. Ranney's treatment forty-five per cent. were cured, forty-two per cent. were materially benefited, and in only thirteen per cent. was no improvement manifested.

The following are a few illustrative cases :

	AGE.	HAD EPI- LEPSY.	OCULAR DEFECTS.	TREATMENT.	RESULT.
Young lady	20	2 years.	Hyperphoria.	Glasses.	Cured.
Man	37	5 years.	Esophoria.	Tenotomy.	Cured.
Girl	15	3 years.	Esophoria.	Tenotomy.	Cured.
Boy	14	1 year.	Eso. Hypero.	" glasses.	Cured.
Man	30	1 year.	Astigmatism.	Glasses.	Cured.
Girl	29	All her life,	Hyperphoria.		
		also chorea	Esophoria.	Tenotomies.	Cured.
Mr. B.	26	2 months.	Esophoria.	2 Tenotomies.	Com. cured.
Mr. H.	43	24 years.	H. Eso.	2 " glasses.	" "
Mr. H.	24	3 years.	As. Eso.	2 " "	Cured.
Mr. S.	19	5 years.	Es. Hyper.	Tenotomy.	Cured.
Mr. S.	16	4 years.	H. Es.	Tenotomy.	Com. cured.
Mr. F.	40	7 years.	H. Es.	4 Tenotomies.	" "
Mr. G.	30	3 years.	H. Es.	2 " "	" "
Mrs. W. . . .	30	2 years.	Esophoria.	Tenotomy.	" "
Mr. P.	26	9 years.	Esophoria.	3 Tenotomies.	Cured.
Miss D. . . .	30	5 years.	H. Es.	2 " "	Com. cured.
Farmer	24	8 years.	Hyper. Es.	Tenotomy.	Cured.

Stevens mentions one case cured by removal of a staphylomatous eye, another by the removal of an atrophied eyeball. A miner with hyperphoria was permanently cured by the use of glasses.

If I might be permitted to mention my own experience, I would briefly relate the case of Miss H., aged twenty-seven, who presented herself at my college clinic three years ago. She had suffered severely from epilepsy for four years, having as high as six severe attacks in one day. She was unable to use her eyes for any near work without producing a spasm. A careful examination revealed a hypermetropia of 2D. and an astigmatism of .50D. with exophoria of 5° for distance and 10° at the near point. Glasses were prescribed to relieve the eyestrain, with the result of greatly reducing the frequency and violence of the attacks. Later graduated tenotomies were performed upon both external recti until there was a perfect balance horizontally. She then had a *petit mal* once or twice a day, but no more spasms as formerly. A further examination revealed a right hyperphoria of 2°, which up to that time had been entirely latent. This was corrected with prisms, and the patient at last hearing was free from the last ves-

tige of the trouble. One practical demonstration like that is worth more than the unbelief of all skeptics put together.

Katie S., aged seven. For two years had suffered from several seizures per day. They were generally preceded by intense pain in the stomach, and the poor child was terribly afraid of these attacks and begged most pitifully to be relieved. When three years of age she had been partially paralyzed on the left side, and when she came to me was unable to speak plainly. Her vision was only 20-80 of normal, her refraction under atropine being hyperopic astigmatism (+ 2D. \ominus 3D. ax. 90°). During spasms her eyes turned out. She had left hyperphoria of 2° and exophoria of 10° for distance. Glasses were at first prescribed, which reduced the spasms to one per week. Tenotomy was insisted upon, but was strongly opposed by her family physician, who wanted to try some "new remedy." This failed. In despair the parents then turned to the so-called Christian (?) Science (?). The glasses were removed, and the spasms returned with violence. Here was a case in which the disease was clearly of ocular origin, and if the parents had allowed the evident eye-defects to be removed, the child's health would have been restored. They were afraid of the knife, although graduated tenotomies are not dangerous and are not at all painful. They do not confine the patient to a dark room, nor even to the house in good weather. Hence, they need not be feared, and the fact that reckless operators have overdone a good thing should not militate against the operation itself.

Unless every reflex cause from whatever source is removed, nature may be hampered in her efforts to establish a perfect nervous harmony, and as a result new attacks may occur. Sometimes a floating kidney, or a copper penny in the stomach, or an atrophied testicle in a person in whom the epileptic habit is established will keep up enough irritation so that after some extreme nervous strain another seizure will occur where the same cause would only have produced a slight inconvenience in a healthy person.

A case in point. Mr. J. W. R., age thirty, sent me by

Dr. Doyen. His epileptic attacks began at the age of twelve years. They occurred in groups of three every two or three months, always coming on after severe use of the eyes in reading late at night. His eyestrain was relieved with glasses and his attacks reduced to one in six months. No further ocular trouble could be discovered, but he then confessed that he had an atrophied testicle. He was accordingly sent to a neighboring surgeon, who removed the useless organ. That was two years ago, and he is now entirely free from the disease.

Other causes which sometimes induce a return of the seizures after correct eye treatment are neglect to wear the glasses prescribed and the bending of the frame so as to throw a strong cylinder out of axis. But instead of disproving the correctness of the treatment this only emphasizes it. Hence, the greatest fidelity on the part of the patient is necessary to his perfect cure.

Again, some latent heterophoria hitherto undiscovered may cause the disease to break out again. One reason so many oculists pay so little attention to muscular unbalance is because the problems presented are so often difficult of solution. Up to the present time there is no known medicine nor appliance which will reveal all the muscular trouble at one sitting. Hence, to attain success in this matter, especially in cases of epilepsy where the heterophoria is generally latent, the oculist must be patient, painstaking, and persistent.

Prismatic glasses must be used for the purpose of uncovering latent defects. They seldom cure an epilepsy, it is true, but judiciously handled they will bring to light the real heterophorias, which may then be radically removed by tenotomies.

Finally, instead of drugging epileptic patients with stupefying bromides, which at the best are only palliative, a scientific examination of the eyes is of supreme importance in every case. All errors of refraction should be fully corrected, and all muscular unbalance removed. The relief then obtained is radical in that it removed the predisposing cause of the disease. This we think we have proved from clinical facts; the testimony of many authors in many cases being overwhelming evidence.

THE BOUGIE IN OCCLUSION OF THE EUSTACHIAN TUBE.

BY HERBERT A. CHURCH, M. D., SYRACUSE, N. Y.

I HAVE selected the subject of this paper because it is one which has not been much written about, and because I wish to draw out a discussion of this subject, which might be profitable to all. I find but little literature in regard to it, and do not know of many who are using the method which I have adopted.

Partial or complete occlusion of the eustachian tube is of frequent occurrence, and may be due to a simple catarrhal condition and hyperæmia of the mucous membranes, a growth, or to chronic inflammation resulting in a narrowing of the lumen of the canal.

The symptoms produced are quite familiar to all, such as impairment of hearing, tinnitus, and sometimes attacks of vertigo.

The membrana tympani is always more or less retracted according to the partial or complete closure of the eustachian tube.

The treatment of this condition varies according to the extent of the occlusion and also what produces the narrowing of the canal. Sometimes the hyperæmia may be relieved by the removal of foreign growths, and local treatment. Simple inflation by the Politzer method may effectually open the tube and give access of air to the middle ear; however, if this is not sufficient you may accomplish the desired result by the eustachian catheter.

There is another class of cases which will not be relieved

by either of these methods, and it is to this class I wish to call your attention. These are the ones which you will find it impossible to inflate, or only partially, and consequently you are unable to make any or very slight improvement.

I have had made a set of bougies which I have been using for some time for the purpose of opening the occluded tube. They are made of copper, varying from No. 2 to No. 6, French scale, mounted on piano wire. They are placed in the ordinary hard-rubber catheter. On the outer extremity of the piano wire is a set-nut which is used to indicate the distance you wish to insert the bougie in the eustachian tube.

I find much less difficulty is experienced if cocaine is applied to the eustachian orifice before using these bougies. I find a very convenient way for applying cocaine to be through a catheter which has a very short, sharp bend at its extremity, and driving a spray of a four-per-cent. solution of cocaine through this by applying a spray tube to the other end. In this manner you can direct the spray to the desired spot, thereby causing a shrinking of the mucous membranes as well as lessening the spasm incident to the manipulation required. The instrument is then carried into the pharynx and placed in position as you would for catheterization. The set-nut is an inch and a half from the end of the catheter. The bougie is then advanced into the eustachian tube. Should you be uncertain that you are in the tube, you can easily ascertain by rotating the catheter. If the bougie is engaged in the tube, the catheter will remain fixed. The bougie is passed until it reaches the isthmus, which is usually about an inch and can be easily felt as the bougie becomes engaged in it. It is not necessary to go farther, as there is danger of doing injury to the tympanum.

It is at this point you will find the most difficulty in the tube. It is well to withdraw the bougie again and pass the constricted parts several times. This operation should be repeated at intervals of three or four days at first, and later at intervals of a week or two.

I have had good results in some very old cases which have resisted all other treatment. I had these made of copper, expecting to use the galvanic current as it is used in other strictures, but I have had such good results from simple dilatation that I have not used them for that purpose. In many cases the tinnitus and the pressure which so many complain of are relieved immediately.

Following this treatment of dilatation, I did not use the catheter to inflate immediately after passing the bougies, as emphysema is sometimes produced in this way.

This is not an original idea, but has been used by Dr. A. B. Duell of New York; Dench also uses a similar arrangement, but instead of copper he uses cotton twisted on piano wire. I do not see the advantage of cotton, and there is also the danger of losing the cotton in the tube, which would be a very serious accident. I have recently seen a set of bougies designed by Urbanstich of Vienna which were made of celluloid. I have not as yet been able to procure a set, and I do not know why they are superior to the ones I already use.

The advantage I have found in this treatment is that you can accomplish what has been impossible by any other method.

SYMPTOMS AND TREATMENT OF ENLARGED TONSILAR CRYPTS.

BY IRVING TOWNSEND, M. D., NEW YORK.

DURING the past two years I have examined these cases with increasing interest, and am convinced that they constitute a most important factor in the ætiology of the mild recurrent attacks of "sore throat" seen in adult patients, which are so difficult to classify under any of the terms used in our text-books on the nose and throat. In addition to this local soreness, certain symptoms have been observed, such as laryngeal spasm and a condition of the nose resembling hay fever. Asthma may perhaps arise from the same cause, though I have never observed it.

Patients often complain of sensations of a "lump in the throat," causing a desire to swallow, or of slight soreness of the throat on one or both sides, when a superficial examination fails to reveal any adequate cause. Occasionally the symptoms are described as a sort of dryness or tickling, or perhaps a spasmodic cough exists, with sometimes a history of the expulsion of a whitish, cheesy mass from the throat, which affords relief almost immediately. The symptoms may last only for a day, but sometimes continue for one or two weeks, and recur again after a brief interval. In patients of a nervous temperament, a coryza or some other reflex phenomenon is not infrequent.

Examination of the throat usually shows congestion, and sometimes a chronic follicular pharyngitis or enlarged lingual papillæ co-exist. The tonsils are usually hypertrophied, but often to a very slight degree.

After excluding the more common conditions (that cause

similar symptoms), it is my custom to search with a probe for pockets caused by adhesions between the tonsils and the faucial pillars, and to examine carefully the surface of the tonsils and probe any crypts that may exist. The ring probe, bent at an angle, will usually dislodge the contents of such cavities, after which their size and location can be determined. The patulous openings are simply the exits by which the secretion of the gland escapes and enters the pharynx, but may become so much enlarged that particles of food enter and find lodgment in the cavity thus produced. The natural result is fermentation and the development of toxic substances, which being absorbed cause an inflammation of the tissues adjacent. The lymphatic glands that lie in close proximity may be involved, and in more than one instance I have known the condition to be diagnosed as diphtheria. Such a mistake should not occur if the case can be carefully examined, as the contents of the sac may be easily removed by a ring probe.

If the tonsils are much enlarged the best treatment is excision, either with the tonsillotome, or electro-cautery snare, but in those cases presenting only moderate enlargement the treatment I prefer is hereafter described. I have had rather indifferent success with the old method of inserting the point of the cautery knife and burning the interior of the sac, in order to close it up by causing an inflammatory adhesion of its walls. Theoretically it is beautiful, but practically it has not been a success in the majority of the cases I have seen treated in this manner. Caustic acids have been used for the same purpose, but are open to the same objection, viz., that it is seldom possible to destroy the entire secretory surface of the sac, which is necessary to success, and without which a closed cavity is formed that is likely to cause trouble. I have had two cases of quinsy which I am confident were caused in this way, both of which followed the use of the electro-cautery.

The method that I prefer, and one which appeals to me as a scientific surgical procedure, may be described as follows: Where several crypts are present, a probe, bent at the proper angle, is passed into the lower opening and carried

downward, after which the tissue is cut through with a curved scissors or a round pointed bistoury to the bottom of the cavity. Proceeding upward, each cavity is entered, and the intervening tissues cut through so that it communicates with the one below. When completed, the tonsil presents a somewhat irregular incision extending vertically through its center. The edges of the wound may be cauterized and any irregular flaps trimmed off. The retraction of the edges of the incision in healing is considerable, and the result is usually most satisfactory. There is little or no pain and very slight inflammatory reaction. In cases refusing tonsillotomy, and those which (for any reason) it is considered best not to excise, this is a very good alternative, and I have never seen a case where any objection was made, or where the patient complained of pain—as an application of cocaine was always made. Any adhesions between the tonsils and the faucial pillars should be torn or cut through in order to get the best result.

As in hypertrophies elsewhere, it is not the *size* of the tonsils, but the amount of disturbance produced, that should be considered. Many tonsils of large size are of little pathological importance, if located in a capacious throat and free from the surrounding structures; while others, of normal dimensions, may be the source of much discomfort and trouble. The existence of large pockets in the tonsils undoubtedly constitutes a source of danger, as they offer a lodging-place to all kinds of disease germs that enter the body through the mouth or air passages. This, I think, will be accepted as a fact; and, if so, the only conclusion that can fairly be arrived at must be in favor of their obliteration. In making a choice of the method to be employed, I desire to emphasize my preference for the *cutting* operation, whether it be by means of the tonsillotome, or the scissors and tonsil knife.

This outline of the subject is only intended as a preface to a more detailed consideration at a later date, and I shall be gratified if the discussion elicit any new ideas that have a practical bearing on this question.

Discussion :

DR. H. WORTHINGTON PAIGE.—I cordially concur with Dr. Townsend that enlarged tonsilar crypts are an important factor in the causation of recurring attacks of *mild sore throat* in many individuals. I have not observed laryngeal spasm or asthma in this connection, but I have usually seen an accompanying but mild coryza, and have regarded it as the natural result of the "cold" which was the exciting cause of the attack.

I have looked upon these seizures as a mild form of follicular (or as Bosworth more properly terms it, croupous) tonsilitis, limiting itself to one or two large crypts which prove a favorite site for inflammation by reason of their location and condition, offering as they do lodgment for particles of foreign matter.

I have not used the incision method of treatment as described by Dr. Townsend, though I should think it would be an excellent radical procedure in the more severe or obstinate cases when the tonsil is fairly percolated with deep lacunæ—a constant menace to the comfort and health of the patient. I have, however, severed adhesions to the faucial pillars and cut through partitions and bridges between the crypts. I always use the ring probe to dislodge the cheesy and offensive masses—enlarging the openings to the crypts with the bistoury if necessary. I then carefully touch the cavity, thoroughly, with tincture perchloride of iron, Churchill's iodine, or a solution of argentum nitrate 60 grains to the ounce. I apply these same solutions to the larger crypts in chronic cases, but prefer the electro-cautery in the smaller crypts—in fact, I think the cautery more efficacious in the smaller than in the larger lacunæ.

CONSERVATIVE TREATMENT OF WOUNDS OF THE EYEBALL.*

BY E. ELMER KEELER, M. D., SYRACUSE.

THE general surgeon of to-day prides himself upon being conservative—or, more properly, preservative—in his work. It means more to be a truly skillful surgeon to-day than ever before, for not only must he, as in the past, be one knowing the anatomy of the part requiring the operation, the precautions necessary for the patient, his instruments and himself in regard to thorough surgical cleanliness, the technique of the operation in every detail, the toilet of the wound and its immediate and subsequent dressings—not only must he know all this, but, of far more importance, he must know when to operate and also when not to operate. None knows better than the conscientious surgeon how much easier it is to operate than it is to cure. The shining steel of the surgeon dazzles with its possibilities of a brilliant operation and a quick result. If this be true of the general surgeon, it may as truly apply to the ophthalmic surgeon.

During the past fifteen years I have met with the average number of wounds of the eyeball where surgical interference was more or less strongly indicated. In these cases I have, as a rule, insisted upon such conservative surgery that in several instances it has been criticised by counsel. In each case where wounds of the cornea have been brought to me I have felt it my duty to first “give the eye a chance,” to find out just how much could be accomplished with the

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proper external and internal remedy and perfect quiet of the eye and the patient. This has in several instances done wonders.

Considering the haste with which some oculists remove nearly every eye presenting a puncture of the cornea, with or without incarceration of the iris in the wound or wounds of the sclera near the equator, one would think that sympathetic ophthalmia was sure to follow in each and every case unless the injured member was instantly removed. This, I acknowledge, has rather been the trend of our teaching in the past. De Schweinitz speaks of one such case where sympathetic ophthalmia occurred in forty-eight hours as something quite unusual, and yet I know of debatable cases being operated upon within a very few hours "for fear of sympathetic ophthalmia"; the operation referred to being the enucleation of the eyeball. My rule has been that in every eye, no matter how severe the injury, providing that the ciliary body has not been injured, to make haste slowly. In this way I have several good eyes to my credit to-day where at the time of the accident removal seemed almost imperative. To a few of these cases I wish to call your attention.

The first of this nature occurred in the practice of my preceptor prior to my graduation, and impressed itself most firmly upon my memory. This was the result of a Fourth of July celebration where percussion caps were being exploded by placing them on a stone and striking them with a piece of iron. A piece of the stone or iron or cap struck the eye of the boy near the corneoscleral margin and tore a jagged opening into the anterior chamber; passing directly across it, wounded the iris on the opposite side and disappeared, probably escaping by an opening which could not be seen when the patient was first brought to the physician's office. The case was not seen until twenty-four hours after the accident, and then the anterior chamber was filled with blood, as was the conjunctiva, symptoms of iritis being present. On the whole, the case was one offering little chance for saving the eye, and enucleation was suggested as the easiest way out of the trouble. Instead of this, however, being necessary, the eye was saved with considerable vision.

In another case occurring in this city some nine years ago a shoemaker was pierced through the eyeball with the awl of a fellow-workman. The instrument penetrated well into the interior of the eye, piercing the cornea quite centrally, the iris to the upper side, and the lens near its periphery. This case was seen first by another oculist, who was sent for by one of the man's companions very soon after the accident occurred and at once began to prepare for the removal of the injured eye. The family physician, arriving at this time, said that he would not consent to that until my arrival, and at this the other oculist very hastily left. After very carefully inspecting the wounded eye, I stated to the patient that undoubtedly the easiest, quickest, and cheapest way was for him to have the eye removed, as the sight was probably lost, and that it was quite probable that inflammation would ensue, making its subsequent removal necessary. Turning to me he said, "Doctor, if that was your eye would you have it taken out to-day?" Appealed to in this way, I told him that if it was my own case I should wait at least a few days and see what inflammatory changes occurred. "Then," he said, "I will do the same." In this case an eye was saved which was perfect in appearance and had sight enough to count fingers.

In another case let me in a few words describe the condition in which I found the eyeball, and where there seemed to be every reason for the immediate removal.

This patient came to me with a prolapsed iris hanging out of a jagged wound in the lower segment of the cornea, with of course complete obliteration of the anterior chamber. Here the accident had occurred five days before I saw the case, and had been under the care of the family physician, who had said that he "guessed that it would come around all right if she didn't catch cold in it." The cornea appeared almost dry, the external eye was intensely inflamed, and yet, strange to say, there was no iritis, nor did any follow. The protruding mass of the iris appeared in such a healthy condition that no iridectomy was considered necessary. The wound was thoroughly cleansed and the iris carefully returned; the patient made an uninterrupted recovery, and has as good vision as ever.

Whether it had anything to do with the result or will be used as an argument for or against universal suffrage, I will

state that this accident occurred while the patient, a woman, was splitting wood.

Another case occurring last winter, and seen by several of the members of this Society, presented several unique features.

Dr. N. was struck over the eye by a heavy nail which he was just commencing to drive into a plank. His glasses, which he was obliged to wear constantly on account of astigmatia, were broken into bits, and many of the minute fragments were driven into the right eye; most of the particles entered the eye near the outer border of the cornea in a group and were easily picked out; several were removed from and under the surface of the conjunctiva, still others from the substance of the cornea, while some were lost in the anterior chamber. On account of the perfect transparency of the particles it was almost impossible to locate them. A great amount of ciliary pain and iritic irritation followed for several weeks. The iris could not be brought down to a perfect pin-point hole with eserine, but seemed to be bound down with one thread-like adhesion. Atropia produced perfect dilatation and would relieve the pain. Iridectomy was discussed, and at this point the case was seen by Dr. Boynton and others. Shortly after this I detected a slight elevation of the conjunctiva to the outer side of the original wound. I then rendered the eye as anæsthetic as possible with cocaine and cut through to the projection, and found and removed a claw-shaped spicula of glass one-twelfth of an inch in length, the lower extremity of which wounded the iris in its removal, and was followed by the aqueous, showing that it had pierced the iris and had held it for all this time, nearly five months, without serious results, other than the accompanying pain. The eye then quickly returned to its normal condition, refraction was restored, and no deformity resulted, as would have been the case had iridectomy been performed.

I do not wish to be understood as advising an expectant line of treatment in every case of injury to the eyeball, for I have had my share of those cases where nothing but enucleation would have been allowable, but I take pleasure in reporting these few cases to show what may sometimes be accomplished by other means than the knife.

THE USE OF STEAM IN DISEASES OF THE CORNEA.*

BY ELMER J. BISSELL, M. D., ROCHESTER.

NY 75 Fitzhugh

STEAM under varying methods of application is cauterizing, hemostatic, anæsthetic, deodorizing, and antiseptic. As it is a combination of heat and moisture, it



relaxes the tissues, diminishes tension, and lessens pain. Aside from its use in simple and combined vapor baths and as a sterilizing agent, it has been but little employed therapeutically. During the past three years, however,

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French, German, and especially Russian, physicians have been using it quite extensively in surgical and gynecological practice as a hemostatic and cauterizing agent. Its power to get into small cavities not easily reached makes it of great service in treating offensive discharges. The favorable reports of its use as a hemostatic in uterine, abdominal, and general surgery are most remarkable. When it is employed, healing by primary union seems to be facilitated.

I have seen no mention, however, in American literature, of its use in eye work. A year and a half ago, while in Paris, I found two or three of the clinics applying it in the various forms of keratitis and opacities of the cornea.

The apparatus which I show here is the one used in eye work. It is arranged so that either one or both eyes can be steamed at the same time. The chief essential of an instrument for this work is that it be so constructed as to prevent the patient's being burned by the steam. This is here accomplished by a diaphragm with only one-half millimeter perforation placed about halfway in each projecting arm. Just beyond this small perforation there is a larger external one which permits the air to mix with the steam before it escapes from the end of the tube.

I usually begin the treatment by placing the eyes of the patient about six inches from the opening and gradually have him approach to within three inches; by so doing the temperature of the steam when it reaches the eyes increases from 100° F. to 112° F. I continue the steaming from ten to twenty minutes. In this way I have used it in a large number of cases of inflammation, ulceration, and opacity of the cornea, with very gratifying results.

It lessens the pain so frequently present, shortens the inflammatory course, stimulates healing in sluggish ulcers, and aids in the absorption of opacities.

After the steaming process I place on the cornea yellow oxide of mercury cerate, calomel powder, resorcin, or whatever agent seems indicated, and then make gentle massage over the closed lids. In recent opacities of the cornea the results have often been marvelous from this method.

SPURS OF THE NASAL SEPTUM.

BY HERBERT W. HOYT, M. D., ROCHESTER.

IT will be the endeavor in this paper to speak only of spurs and ridges of the nasal septum, independently of deviations, except as the latter are mentioned in differentiation. Some authors do not even classify them under separate heads, which has a tendency to confuse the reader regarding diagnosis and treatment. For the present purpose, a spur will be defined as a growth of tissue, whether cartilage or bone, projecting from the septum into the nasal space, either on one or both sides, without a corresponding depression on the opposite side of the septum. These spurs may be single or multiple, and of various forms. Some are sharp and long, like the spurs on a cockerel's leg; others are rounded like papules; while another class is elongated on the septum, forming a ridge not unlike a mountain chain on a relief map. Some of the most excellent text-books on nasal diseases barely mention these pathological structures, and if mentioned, as in Morrell Mackenzie's classic, such words as these are found regarding them: "Exostoses are not very uncommon, though they seldom attain a large size, and hence do not give rise to much inconvenience." Most of the literature regarding these growths is found in the periodicals of the past few years. The cause of these growths is to a certain extent theoretical, but aside from traumatism there is little doubt that they are "the direct result of hypertrophic or vasomotor changes all along the sutural lines, causing perichondritis or hyperostosis," not unlike the deposits about joints and sutures from arthritis. If in the develop-

ment or growth of one of the bones of the septum there is more activity on one side than on the other, there will be an increase of tissue which may be sufficient to cause some considerable projection into the nostril. A blow on the nose may cause a slight fracture or dislocation of the articulation between the triangular cartilage and its contiguous bone. The accompanying inflammation will cause thickening of tissue, and lay the foundation for the growth of a spur or ridge.

The symptoms are direct and reflex, but the latter are the more interesting, and have lately been the means of attracting a great deal of attention to these innocent-looking growths. The direct symptoms are obstruction to breathing, pressure-pain from crowding against the turbinates, epistaxis, dryness, secretions, nasal twang, and in extreme cases deformity of the external nose. The reflex symptoms of an intranasal spur are very numerous, equaling in some cases those from obscure eye troubles. Some of the more common ones are sneezing and coryza, so painfully manifest in hay fever, asthma, aphonia, cough, headache, and visual disturbances. Many of the symptoms are the same as are seen in deviation of the septum, polypi, or hypertrophy of the turbinated bodies. Thus it is necessary, that a careful examination with a good light and speculum be made to get a differential diagnosis.

A deviation of the septum always consists of a projection of its surface on one side and a concavity on the opposite side, in the same locality. The depression may not be correspondingly large, but it will be found. A spur or ridge may accompany a deviation, but the spur has no concavity to compensate it, and as a spur is usually a growth of superabundant nutrition of the part, it is more likely to be accompanied by nervous symptoms than a deviation, which produces principally symptoms of mechanical obstruction. Often the septum will appear smooth and straight as far as visible, until cocaine is applied to the turbinates, which usually shrinks them sufficiently to disclose any trouble further back. Many spurs of the most

annoying variety are obscured by enlarged turbinates, and would be missed entirely if cocaine were not used. A two-per-cent. solution is strong enough for examination merely. By touching the spur with a probe it is easily determined whether it consists of hard or soft tissue. A true spur is hard. Some of the spurs are sharp as thorns and are hard and bony, while others are covered with thick layers of connective tissue and are cartilaginous inside. If a spur is growing from the sutural line of the triangular cartilage and the vomer, it is apt to be both cartilaginous and bony. Often it is possible by the shape and location of the spur to tell the patient what symptoms he has without asking a question.

The region where a spur or ridge is most likely to set up strong reflexes is from one-half to two-thirds of an inch above the floor, and one and one-half to two inches back from the tip of the nose. This is also where the most sensitive nerves of olfaction are located, and is opposite the middle turbinated body, where it is usually so close that a very small spur will touch it. Now and then a nose is seen in which the enlarged turbinates are not at all responsive to the contracting influences of cocaine, and it is impossible to see parts of the septum. In such a case a flexible probe, bent into a hook at the end, can be used to feel along the surface of the septum and outline any irregularity, as one would a calculus in the bladder with a sound.

Observation shows that a smooth, straight septum is more comfortable and less liable to the influence of a variable climate than one deviated or irregular by means of growths from its surface. To attempt to make every septum perfectly uniform would be an impossibility, and in many cases unwise. Experience has shown that it is not necessary that a growth must be large enough to shut off the air space, or crowd into a turbinate, to need correction. Cutting off half, or even one-fourth, the breathing space of one nostril will throw extra work on the other, set up congestion, and irritate the membranes. A promi-

ment point in the air passages is more exposed to the current of air, catches dust and secretions, and is itself irritated, setting up direct or reflex symptoms.

There is only one treatment for these growths, and that is removal. Many and varied are the methods of operating on the spurs of the septum, but in the large majority of cases the saw is the best instrument. A delicate, rapidly cutting saw like the Curtis is, in the opinion of the writer, the best. If the spur is well forward, especially if near the junction of the skin and the mucous membrane, it makes a nice operation, with more rapid healing, to dissect out the spur. This is done by splitting the mucous membrane over the growth and loosening it with a delicate elevator or handle of a scalpel. When the growth is well exposed it can be sawed or cut off, and the flaps of membrane carefully coapted with fine-silk sutures. The galvano-cautery will remove small growths, but the wound is slow to heal, and sometimes ulceration and a perforation result in the cartilage. The trephine and drill cause jagged wounds and are more apt to set up severe hemorrhage. Electrolysis is advocated by some, but the writer has had no experience except in witnessing its use in some foreign clinics. Careful attention to antisepsis before operating is necessary, but afterward, if the wound is not inflammatory in character, it heals best if left alone. The secretions of the nose are to a certain extent germicidal, and the nearer to a surgically dry wound the tissue can be kept, the better the healing. Keeping the membrane boggy with watery sprays and douches does not promote healing, but to a certain extent takes the tone out of the tissues. When a spur is removed, it should be taken off flush with the plane of the septal surface, so that in healing it will not leave a mound of cicatricial tissue to need further treatment. Often granulations will pout out from the healing surface, which ought to be snipped off or cauterized.

Two cases only will be cited to illustrate the reflex action of spurs of the septum:

Miss W., a kindergarten teacher, noticed that when she was reading aloud to the children her voice would grow hoarse and the larynx tired. An examination of her nose and larynx revealed nothing abnormal, except a small sharp spur on the left of the septum, nearly opposite the center of the middle turbinated body. This was excised, and the surface soon healed. To her surprise and joy, no trouble in reading was experienced afterward. Mr. T., a student, had frequent left-sided headaches, which would prostrate him for a day at a time. Correction of a slight astigmia did not relieve him. On examination a large spur was found, well back on the left of the septum, pressing strongly into the middle turbinate. Removal of this growth made his nose feel very much clearer and put an end to his headaches.

EMPHYEMA OF RIGHT FRONTAL SINUS (CLINICAL REPORT).

BY J. B. WOODWORTH, M. D., CLEVELAND, O.

In June, 1897, Mrs. H., æt. twenty-six, consulted me on account of a headache from which she had been suffering for more than eight years. It commenced, apparently, as the result of a cold following an attack of ague, and continued with varying intensity during the succeeding years. During the last two or three months it had increased in severity until it was almost unbearable.

Physicians and oculists had been consulted, and various remedies and glasses used with little or no benefit.

The pain was sharp and cutting, and located in the frontal region, over the right orbit. It commenced invariably upon awakening in the morning, continuing until near noon, when it gradually subsided. Though much exhausted, the patient would be free from pain until the following morning, when the experience would be repeated. Day after day this occurred, the only means of obtaining relief being by increasing doses of opiates. There was considerable tenderness on pressure over the frontal region, and a bursting feeling, especially upon leaning forward.

Dry crusts formed in the right naris, entirely occluding the passage at times, while the patient had, on one or two occasions, noticed a slight discharge from that side when stooping.

Examination of the nasal passages, after removal of the crusts, showed the right cavity slightly larger than the left, due to a deflected septum; and, what was of more value as indicating the seat of the trouble, a drop of yellowish discharge was observed between the middle turbinate and outer wall of the right side. A blunt probe passed into the middle meatus forced out more dis-

charge, demonstrating that it evidently came from one of the accessory cavities.

From this fact, together with the foregoing symptoms, the case was diagnosed as empyema of the right frontal sinus, and operative measures advised. Two methods of evacuating the cavity were feasible, viz., either to make an opening beneath the eyebrow, near the nose, or to open through the nasal cavity. From having known a case in which discharge continued from the external opening for several years, the patient objected to the former method, as she feared the possibility of such a result in her own case. Aside from this fact, the latter method seemed the more advisable; especially as, when the membranes were contracted, instruments could be passed into the middle meatus and upward without the necessity of removing any tissue.

Cocaine was thoroughly applied to the upper portion of the right cavity, not alone to deaden the parts, but particularly to contract them, thus affording a better view and more space in which to operate. A firm, sharp-pointed probe, about an eighth-inch in diameter, curved at the end, was passed into the middle meatus, and, after several attempts, forced upward into and through the infundibulum to the frontal cell. Two or three teaspoonfuls of bloody, greenish-yellow matter soon escaped, giving complete relief. The cavity was carefully syringed with peroxide of hydrogen and tepid water, equal parts, followed by the application of an antiseptic powder. This was repeated daily for two or three days, after which the patient returned to her home. Up to the present time there has been no return of the headache, and no discharge or crusts.

This operation would not be practicable in every instance, especially without removing a portion of the turbinate or other tissue; but it shows the possibility of curing frontal abscess without an external operation, as well as reminding us of the intimate relation between persistent frontal headaches and disease of these cells.

THE INCISION OF THE ANGLE OF THE IRIS.*

BY DRS. VALUDE AND DUCLOS.†

THE question of the pathogenesis of glaucoma, a most important one for the oculist, is at the same time one of the least clearly explained. It will therefore be well, perhaps, to discuss this subject at length.

In spite of the very interesting works that have been published concerning the part played by the angle of the iris and the obstruction of the paths of filtration of this part of the eye, it is not certain that the future will not make known to us, with the real origin of glaucoma, what the truly rational treatment of this grave affection is. The iridectomy which has been so happily applied to irritative glaucoma by Von Graefe, while it may be of great importance, has not had its action fully explained. The same is true of the more recent operation of sclerotomy, and especially of the operation derived from it, consisting of an incision of the iritic angle, which we may call with De Wecker internal sclerotomy, or with De Vincentiis incision of the iritic angle.

Authors who have written of this matter have expressed the intention of opening the channels (at least in this operation), by freeing the angle of the iris, in order to allow filtration of the intraocular liquids, but there is wanting in these works any anatomical demonstration proving the

*From the laboratory and the ophthalmological clinic of the Hospital Quinze-Vingts.

† Translated.

necessity of this step for the cure of glaucoma and the salutary effect of the operation.

In order to demonstrate the first of these two propositions it would be necessary to enter into the study of the pathogenesis of glaucoma, and such is not our intention at present. Therefore, we shall attempt no more than to explain the effect, more or less salutary, that we may have in the case of sclerotomy or incision of the angle.

Being given this operation of internal sclerotomy, which is wholly empirical, since we do not know the true origin of glaucoma, we would simply like to know exactly what it offers from an anatomical point of view. For this operation, empirical as far as concerns the desired object, is no less uncertain in the results obtained, since one operates with a concealed blade, and systematic anatomical examinations of the operated eyes have never been made in man, and it is precisely and only this point that we wish to make: to represent to operators, to partisans of sclerotomy or of incision of the angle of the iris, the anatomical results of their intervention. It is said that in sclerotomy the sharp instrument tears the sclero-corneal tissue, freeing the canal of Schlemm, etc.; we wish to account for the results obtained rather than rest on vague conjectures.

To this end we have operated sixteen eyes taken from dead infants, in such a condition that there was no loss of tension; six were incised by the instrument of Vincentiis, six with Valude's needle, and four with Von Graefe's knife. These eyes, once operated, were fixed by immersion in a solution of formol and cut with a microtome, generally in a regular series from the point of counter-puncture to the point of introduction of the instrument.

The anatomical conclusions that we are forced to draw are:

1. Concerning the general anatomical effects produced by incision of the angle of the iris;
2. Concerning the special effects at different points on the line of incision;
3. Concerning the special results corresponding to the use of each of the three instruments.

Sclerotomies. Vincentiis' operation and internal sclerotomy.—Before describing the operation of sclerotomy, proposed by De Wecker in 1871,* to replace iridectomy in a large number of cases of glaucoma, let us note the fact that paracentesis was recommended in 1830 by Mackenzie,† and the scleral punctures practiced by Desmarres in 1847, to combat the attack of prodromal glaucoma and irritative glaucoma. We must also note the attempts of Hancock;‡ carried on, among others, by Blumstead,§ Heiberg (of Christiana), Vose Salomon,|| Serres (of Alais),¶ and discussed by Knapp,** Ricci,†† and Rosebrugh.‡‡ We will refer again to these essays in speaking of the results obtained by the operation of M. de Vicentiis.

Hancock enters the point of the cataract knife in the inferior and external part of the circumference of the cornea, and carries it across the angle of the iris, disengag-

* Wecker: *Die Sclerotomie als Glaucomoperation* (*Klin. Monatsbl.*, p. 307).—La sclerotomia nella cura del glaucoma. Lettera al prof. Quaglino (*Ann. di Ottalm.*, p. 392, 1881).

† Mackenzie on Glaucoma (*Glasgow Med. Times*, August, and "Treatise on the Diseases of the Eye," London, 1830).

‡ Hancock: On the Division of the Ciliary Muscles in Glaucoma (*Ophth. Hosp. Rep.*, No. 12, p. 13; *Lancet*, February, and *Ann. d'Oculist.*, t. xliv., p. 47, 1861).—Utilité de la section du muscle ciliaire (*Med. Times and Gaz.*, January 18, 1862).—De la section du muscle ciliaire (*Lancet*, March 12, April 12, April 14, 1864).

§ Blumstead.—Glaucome, section du muscle ciliaire d'après Hancock, succès (*Ann. Med. Times*, 14 avril, 1861).

|| Vose Salomon.—De l'incision du muscle ciliaire, etc. (*Med. Times and Gaz.*, 19 et 26 janvier, 9 février, 2 et 30 mars, 1861).—De la valeur de l'incision du muscle ciliaire (*Med. Times and Gaz.*, 18 janvier, 1862).—Operations pour diminuer la tension de l'œil, Glaucome (*Brit. Med. Jour.*, 23 janvier, 10 et 17 septembre, 1864).

¶ Serres.—De la section du tenseur de la choroïde (*Bull. de Therap.*, 30 novembre, et *Gaz. des Hôp.*, No. 31, 1864).

** Knapp.—Ueber Hancock'sche Glaucomoperation (*Heidelb. Verhandl.*, t. iii., p. 155, 1864).

†† Ricci.—Parallèle entre la section du muscle ciliaire et l'iridectomie dans le glaucome (*Dubl. Med. Journ.*, février, p. 62).

‡‡ Rosebrugh.—Iridectomie et section du muscle ciliaire dans le glaucome (*Ann. Med. Times*, juillet, 1864).

ing the ciliary muscle. Heiberg (of Christiana)* at the same time boasted of being able to sever the circular fibers of the ciliary muscle without the radial fibers by giving the needle a peculiar direction; he performed the first operation in the treatment of myopia, the second to overcome glaucoma and hydropsy of the eye. Let us see in the first place if it is so easy to pick out the different fascicles of the muscle of Brücke with a concealed blade.

Let us take notice, meanwhile, that hardly was iridectomy discovered and heralded throughout the world by its marvelous results than the attention of all oculists was directed toward the base of the iris, toward the accommodative muscle—in a word, toward the region of the angle of the iris. At the same time practitioners submitted the most diverse theories to explain the action of iridectomy, and the anatomists studied the method of renewal of the ocular humors and searched again for their channels of excretion.

From this moment, by the active impulse given it by M. de Wecker, simple sclerotomy took a place well ahead of Von Graefe's operation.

Stellwag von Carion,† the first, was successful in a case of chronic glaucoma by making a simple scleral incision. Quaglino,‡ in 1871, devised a large, bent, lancelike knife; he pushed the blade obliquely into the border for a third of its length and, withdrawing it, pressed gently upon the iris to facilitate the draining of the aqueous humor and to avoid prolapse of the iris. If in spite of this the iris became engaged in the wound, the author enlarged the opening with scissors and attempted its reduction; failing in this, he resects the hernia. Bader§ and Spencer Wat-

* Lettre du professeur Heiberg (*Traité d'Opht. de Wecker et Landolt*, t. ii., p. 697, 1886).

† Stellwag.—*Der intraoculare Druck und die Innervationsverhältnisse der Iris*. Wien, 1868.

‡ Quaglino.—Se l'iridectomia sia indispensabile per ottenere la guarigione della glaucoma (*Ann. di Ottalm.*, p. 200, 1871).

§ Bader.—*Sclerotomy versus iridectomy* (*Ophth. Hosp. Rep.*, viii, p. 430, 1876).

son* cut off the border for a certain distance without breaking through the adjacent conjunctiva. Hock† (of Vienna) makes two opposite incisions in the sclero-corneal circle with a *couteau à arrêt*.

M. de Wecker has happily fused the advantages of these proceedings in a single operation which is now classic.

He makes two openings in the anterior chamber crossing the outlet of the membrane of the iris, and joins the interior incision of the sclero-corneal flap left between the two punctures. He shows, further, the forms of the disease in which sclerotomy has particularly good effects. In absolute glaucoma, hemorrhagic and hydrophthalmic glaucoma where iridectomy may destroy what remains of vision by too sudden a reduction of tension, sclerotomy should be tried, as it is sometimes successful, before deciding on enucleation.

The operation, according to this author, has its best results in the prodromal form, avoiding fresh attacks; in the simple chronic form when ophthalmological examination has shown a marked excavation; in the secondary forms with subluxation of the crystalline or a serous choroiditis; in glaucomatous attacks superimposed upon a sympathetic irido-choroiditis.

In his operation, spread widely by his students, M. de Wecker uses a thin cataract knife.

He produces complete contraction of the pupil by repeated instillations of eserine, begun just before the operation (according to Schweigger, sclerotomy ought not to be undertaken unless perfect myosis can be obtained); the blepharostat in place and the forceps fixing the globe of the eye, he pierces the border "as if to make a flap two millimeters in height," beginning one millimeter outside, to the transparent edge of the cornea; penetrating the anterior chamber, he makes a slight curve, if the chamber is re-

* Spencer Watson.—A case of subacute glaucoma; iridectomy; result good (*Med. Times and Gaz.*, 412, 1876).

† Hock.—Acht Sclerotomien nach der von Wecker-Mauthnerschen Methode (*Arch. für Augen- und Ohren-heilk.*, p. 408).—Der gegenwoertige Stand der Lehre von Glaucom (*War. Presse*, H. 6).

duced, at the anterior convexity, and transfixes the opposite point of the sclera-corneal circle; in order to avoid all excess of pressure, he at the same time removes the fixation forceps. The aqueous humor does not escape, and the iris does not drop forward into the slit of the wound; he raises the two lateral incisions upward by gentle sawing movements as if to trim a sclero-corneal flap, at the upper edge, and finally, in removing the instrument, he incises with its point the internal wall of the scleral flap. This withdrawal ought to be careful and prudent, and the incisions made in the border all the more gently the younger the affected eye. As the knife leaves the anterior chamber, the aqueous humor flows out; if the escape is too rapid the iris folds itself about the blade, stopping it by raising up the parts, and determining thus the formation of artificial pupils, which do not appear to harm the future visual perception. The instrument is withdrawn only when all the liquid in the chamber has flowed out. A few drops of a solution of eserine being instilled into the eye, a compress is put on and the patient allowed to rest for two days. The tension disappears slowly, the excess of liquid escaping through the incision; if the tension persists through hypersecretion of the vascular membranes of the globe the cicatrix is harmed; this is not a dense tissue that closes the opening made by the operation and replaces the fibers destroyed in the internal wall of the engaged scleral flap, but a loose network by which a continuous excretion maintains the equilibrium and prevents the glaucomatous attacks.

This is the theory of the filtering action of the cicatrix by which M. de Wecker explains the results of the operation upon the glaucomatous affection.

Let us note that M. de Wecker first insists most particularly upon the necessity of incising, with the point of the instrument, the arcades of the canal of Fontana, although at this time it is not his intention to re-establish communication between the anterior chamber and the lacunar system of the border,—that is to say, to open up the obliterated filtration tissue,—but rather to remove the ob-

struction at the angle of the iris by creating a loose tissue permitting the ocular liquid, that is secreted in excess, to pass out.

Moreover, in affirming that the benefits of his operation result from the formation of a filtering cicatrix opening into the subconjunctival cellular tissue, he insists upon the necessity of freeing the angle of the iris. "What increases the value of this incision and gives iridectomy its curative power and makes well-executed sclerotomy (without iritic adhesions) excel by at least retaining the eye in certain cases, is the fact that in a great number of operations there remains a small portion of the iris that becomes attached, adhering to the wound and obstructing the canal of Fontana * and others. Laying aside the question of enclosure, properly so-called, what it is necessary to avoid with the greatest care is the establishment of adhesions of the iris with the angle of the anterior chamber." †

Nevertheless, sclerotomy has numerous partisans: Mauthner ‡ and Snellen have abandoned iridectomy. It has many drawbacks: first, it predisposes to staphyloma, and, further, the prolapse of the iris cannot always be avoided or reduced. In consequence, it is necessary to have recourse to section and to a mixed operation which Terson, Sr., has described, and which Abadie § has designated by the name of staphylotomy, which M. Panas || has called irido-sclerotomy, and Nicati ¶ scleriritomy and which Knies ** proposes under the name sclero-iritomy.

* De Wecker et Landolt.—*Traité d'Ophthalmologie*, ed. 1886, t. ii., p. 708.

† De Wecker.—*Leçons de chirurgie oculaire*, p. 211, 1879.

‡ Mauthner.—*Aphorismen zur Glaucomlehre* (*Arch. für Augen- und Ohrenheilkunde*, t. vii, I. S. 165, 1878).—*Ueber Iridectomie u. Sclerotomie bei Glaucom* (*Wiener med. Wochenschrift*, Nos. 27-30, 1877).

§ Traitement du staphylome partiel et progressif; staphylotomie (*Ann. d'ocul.*, t. xciii, p. 3).

|| L'iridosclerotomie (*Arch. d'opht.*, p. 481, 1884).

¶ La sclerotomie et ses indications (*Bull. et mem. de la Société française d'ophthalm.*, p. 278, 1892).

** Compte-rendu du Congrès d'Heidelberg, p. 168.—Sclerotomie simple et combinée, par de Wecker (*Ann. d'oculist.*, 1894).

In 1894 the works of De Vincentiis* and his chief of clinic, Dr. Taylor, † appeared.

The Neapolitan physician, refusing to believe in the theory of a cicatrix of filtration, neglects the incision of the border, and, relying upon the importance of the obstruction of the angle of the iris in the development of glaucoma, makes only a puncture of the fibrous envelope, carrying his incision only into the sclero-corneal excretory tissue.

Following his example, M. Rochon-Duvigneaud ‡ proposes to avoid staphyloma, in the classical sclerotomy, by confining the opening of the border to the orifices of the puncture and counter-puncture without widening the two scleral wounds, by making sawing movements with the knife; he designates this modified operation by the name of "abridged sclerotomy" (*sclérotomie réduite*). This change gives more importance to the incision of the sclero-corneal flap and augments its extent.

Finally having seen Dr. de Vincentiis operate, M. de Wecker, § on his return from Italy, made a last modification in his method; he suppressed the counter-puncture and incised the whole deep surface of the sclero-corneal arc, leaving the upper part of his knife sunk horizontally in the border (the *internal sclerotomy* of M. de Wecker).

To make the opening very narrow M. de Vincentiis uses a very fine needle (Fig. 1), the point of which is furnished with an edge at the extremity. Valude adopts the Neapolitan professor's needle, changing its curve to make it more easy to handle (Fig. 2). M. de Wecker continues to use his slender cataract knife.

Under the general term *incision of the angle of the iris*

* De Vincentiis.—Sur la soi-disant sclerotomie interne (*Lavori de Clin. ocul. d. r. Univ. di Napoli*, 1894, 227-235).—*Revue générale d'Ophthalmologie*, Paris, 1895, octobre 31, p. 446-448.

† Taylor.—Sull' incisione del tessuto dell' angole irideo, Atti d. XI. Cong. medic. internat., Roma, 1894.—*Centralblatt für Augenheilkunde*, 1891. Note preventative (*Ann. di Ottalmologia*, vol. xx).

‡ Rochon-Duvigneaud.—*Gaz. des hôp.*, 22 juin, 1895.

§ Sclerotomie interne (*Ann. d'Oculist.*, CXIV., 95-109, 1895, Paris.—*Ann. d'Oculist.*, N. Y., 1895, 103-117).

we will now study the operation consisting in making a single opening in the border, and incision of a certain arc of the angle, either with Von Graefe's knife (sclerotomy according to De Wecker) or with the special needles of De Vincentiis (*incision del tessuto dell' angolo iridico*) and De Valude.

The operation of incision of the angle of the iris.—*Instruments.*—In performing this operation each surgeon will give the preference to the instruments that he is in the habit of using; he is successful with them where with



FIG. 1.—De Vincentiis' Needle.



FIG. 2.—Valude's Needle.

instruments of a better construction he obtains only bad results.

In incision of the angle of the iris, the three instruments in use do not seem to act in the same way and the needles of De Vincentiis and De Valude are more easily managed in inexperienced hands.

In making internal sclerotomy, M. de Wecker continues to use Von Graefe's slender knife, the blade ground off and straight, which almost always serves him in performing the classical sclerotomy with the double opening.

Let us describe the form of needles adopted especially for this operation.

FIG. 1.—DE VINCENTIIS' NEEDLE.

De Vincentiis' needle is essentially composed of a slender steel shaft terminating in a small cutting blade; the shaft,

20-22 millimeters in length, is cylindrical at its base, and flattened toward the extremity, the flattened surfaces conforming to those of the little blade: this change of form is made insensibly throughout the whole length, the thickness diminishing progressively toward the point. This truncated shaft is curved. The little blade at the extremity is very small; the cutting edge being upon the side corresponding to the convexity of the shaft and terminates in a sharp point in the axis of the instrument. The dimensions have been so determined by the constructor that the opening made in the border by the point is exactly filled by the shank. During the passage of the instrument and the engagement of the point no aqueous humor can escape.

FIG. 2.—DE VALUDE'S NEEDLE.

The needle devised by our confrère, fashioned in the same way as regards its dimensions and flattened shape, is furnished with a sharply curved shank; the extremity has more of a lance shape and its sharp edge corresponds to the concave side of the shaft. This instrument seems better constructed to tear and destroy with the point than to cut with the sharp edge; it possesses the same advantages as does M. de Vincentiis' needle in preventing the outflow of the aqueous humor during the incision. The idea that led Valude to modify M. de Vincentiis' needle was to render it more easily handled in making an incision carried over the semicircumference of the anterior chamber. With the Italian instrument convex upon the cutting side, the incision is difficult to accomplish without a new start; with the concave side forward, the instrument is better in hand and the incision is made with a single stroke and rapidly.

To perform the operation, there are needed a blepharostat and a forceps for the fixation of the globe. Having these instruments ready, we will proceed to describe the method of procedure in making the incision with the knife and with the needle.

De Vincentiis' Operation.—Dr. Taylor, in a preliminary note to the *Centralblatt für Augenheilk.** and presented in Rome at the Eleventh International Medical Congress, shows the different kinds of operation practiced by his master, Professor de Vincentiis.

Eserine is instilled in the patient's eye on the day preceding, and just previous to, the operation. It must be remembered that in glaucoma the eye reacts less readily to eserine and that the inflammatory phenomena are more pronounced. A few drops of a solution of cocaine are instilled to reduce the sensitiveness of the border. Finally, the *culs-de-sac* of the conjunctiva are disinfected with an antiseptic solution.

The patient being placed on a bed and the head held firmly, the lids are held open by the blepharostat. The ocular globe projects and is ready for operation. The conjunctiva is picked up with the toothed forceps, as near as possible to the corneal border and at a point opposite to that at which the instrument is to be introduced; the eye is thus easily held in place and may be easily moved to present the point of entrance of the needle. Dr. Taylor recommends that the superior semicircle of the right eye and the inferior semicircle of the left eye be opened; for the reason that it is easier for the operator. Let us recall the fact that, in glaucoma, the superior parts of the circular canal are more clogged than the sloping zone, and that with practice the hand may direct the point in the left eye, either above or below with equal exactness.

The eye being fixed, a Vincentiis needle is introduced at one of the extremities of the horizontal diameter, one and one-half millimeter behind the transparent border; the instrument is then softly pressed in, following the deep face of the cornea; the eye being under eserine and the pupil contracted, there is no danger of touching the surface of the crystalline.

The point, in the strongly contracted anterior chamber,

* *Centralblatt für praktische Augenheilkunde* von Hirschberg, 1891: Über Einschneldung des Iriswinkels, pp. 179-219.

can raise up a fold of the iris; carrying it back until the opposite wall is reached. The needle is fixed under the border, pricking the interior wall of the angle of the iris. At this moment the instrument is slightly turned on its axis in such a way that the cutting edge points upward and forward, toward the sclerotic. Then, describing a semi-circle with the point of entrance as a pivot, the point is carried slowly under the limb, loosening the sclero-corneal tissue. Insensibly the shank in this rotary movement is withdrawn. The blade, traveling in the angle of the iris, approaches the point of entrance; without cutting, the handle is straightened and the entire shaft is removed from the anterior chamber, taking care not to enlarge the opening. The operation has been well managed if, during all the maneuvers of the instrument, none of the aqueous humor has escaped. The point removed, the liquid is seen to start from the point of puncture.

In employing De Valude's needle the same course is pursued; but here the edge of the blade is used less than the point, and during its sweep the fingers feel the sclero-corneal fibers give way with little crepitations.

*Loosening with Von Graefe's knife (internal sclerotomy).—*According to M. de Wecker the instrument used by De Vincentiis is preferable, if the glaucomatous eyes have a shallow anterior chamber. With Von Graefe's knife the best results are obtained only by avoiding all loss of liquid during the sweep of the point. For it is difficult to use the cataract knife without risk of wounding the iris by making a notch in it. Before commencing the operation the same precautions are taken (eserine and fixation of the globe) as in De Vincentiis' operation. The point is introduced one millimeter outside the border of the cornea in the external region of the globe, and is pushed as far as the opposite side of the border; once in place, it is turned toward one of the poles, superior or inferior, to release the filtration tissue. The entrance is the center of this movement of rotation; it is there that all attention ought to be directed. The instrument should, throughout the whole

procedure, close the opening completely. If care is not taken, the sharp edge of the knife, in turning, will enlarge the opening, the aqueous humor will escape, and the iris be folded in front of the knife. Then, if the procedure is continued, portions of the iris are torn away; if one turns back, the anterior chamber empties itself completely, and after that it becomes impossible to complete the operation.

To avoid such an accident it is very necessary at the time that the handle of the knife is rotated downward to loosen the corneal tissue with the point, and when it is withdrawn to incise the last of the semicircle of the angle of the iris, that great care be exercised that only the blunt edge of the knife press against and glide over the lips of the opening. This is not the only care to be taken. Even if the orifice is not enlarged and the chamber kept filled with liquid, while the knife makes its sweep, there are other slips that may be made unless great prudence is exercised. If the point in describing the semicircle of the limb is carried too far back, it drags out the process, detaches the iris, and causes a hemorrhage; on the other hand, if the knife presses too forcibly against the sclerotic, there is risk of breaking through the wall. The knife ought to be held, also, with the edge very slightly forward to avoid wounding the base of the iris, and the incision in the sclero-corneal tissue made more gently when young eyes with a thin, fibrous shell are operated upon.

In the vicinity of the opening all pressure of the knife is removed from the border; it is better not to complete the loosening than to risk passing the sharp edge upon the corresponding angle of the slit.

On the whole, Von Graefe's knife renders the same service as the specially made needles, but only in experienced hands.

Clinical results of freeing the angle of the iris.—These clinical results are based on sixty-two operations made by MM. de Vincentiis and Taylor * and published in March,

* *Lavori della clinica oculistica dell. R. Università di Napoli*, Vol. IV, 1896, p. 223.

1896, in the *Annales* of the ophthalmological clinic of Naples, also on fifteen operations by Sgrosso,* presented to the Ophthalmological Society of Venice, and finally, on six cases in the *Quinze-Vingt* hospital in the service of one of our own surgeons.

Cases from De Vincentiis' clinic.—In the sixty-two cases mentioned the results were, in general, favorable; soon after the operation a diminution in the tension could be noted, as well as an increase in the visual field, an increase in visual acuteness, and a cessation of the attacks of pain. Three years after operation a cure still continued in most of the patients, in a mean of fifty per cent.; relapses occurred in one-fifth of the cases and were treated by a second operation or iridectomy. Taylor notes two failures; in one case of buphthalmus, the instrument being defective, a rapid evacuation of the anterior chamber produced a hemorrhage of the globe, which necessitated an enucleation the next day. The second case was a chronic irritative glaucoma, with considerable contraction of the visual field; in spite of operation, the vision continued to fail; an iridectomy did not arrest the evolution of symptoms which terminated in a complete loss of vision. Finally, in four cases the operation had no effect.

The different forms of glaucoma in which De Vincintiis and Taylor have operated are, three prodromic glaucomas, three acute glaucomas, eighteen chronic irritative glaucomas, twenty-seven simple chronic glaucomas, five hemorrhagic glaucomas or glaucomas with hemorrhage, two buphthalmias, four secondary glaucomas,—one following the opening of a fistula of the cornea, the other following an occlusion of the pupil,—and two consecutive to a serous irido-choroiditis. A beautiful result was obtained in the two secondary glaucomas from opening a corneal fistula and in occlusion of the pupil; in the last case an iridectomy which had been done before had had no effect. In general, the prodromic, chronic irritative, and simple chronic forms of glaucoma have been rapidly improved following

* *Idem*, p. 197.

operation. In the other cases the results have been questionable.

Observations from Sgrosso's clinic.—There were fifteen operations in all: eleven for simple chronic glaucoma, one of which was preceded by prodromic attacks; two for hydrophthalmia, one of which presented a granular state of the cornea and other signs of irritation; two for chronic irritative glaucoma.

In all these cases there was no unfortunate complication. Favorable results were generally maintained, there being only one relapse; in one operation for simple chronic glaucoma, there was a new attack after seven months of apparent cure, and this time in the form of chronic irritative glaucoma.

In all cases except one, in which at the time of operation there were found degenerative changes, the tension declined to the normal in from twenty-four to twenty-six hours. The papillary excavation disappeared entirely in one eye, where, it is true, the chronic glaucoma had had a rapid evolution; it completely disappeared in one case of recent glaucoma.

The author of the paper has especially called attention to the modification of the visual field after this operation on the angle; in the majority of cases he has noted a recovery of sensibility in the periphery of the contracted zone.

Observations at the Quinze-Vingt Hospital (during the service of Dr. Valude).—Six eyes were operated upon by freeing the angle of the iris; five were simple chronic glaucoma and one hydrophthalmia. In one case the needle was inserted in the ciliary process; in another, Von Graefe's knife tore the iris in three places. In the first case the chronic glaucoma was of three years' standing; the excavation was deep and the papilla was already blanched; the result was *nil*; the patient, returning to the clinic eight months later, had lost the perception of light. In two cases of chronic glaucoma the visual acuteness improved after the operation; in the first case from one-thirtieth to one-

tenth; the second from a fifteenth to a sixth. The patients not returning to the clinic, it is not known if the improvement was continued.

In the third and fourth cases the vision, less distinct immediately after the operation, was improved later; at present the vision in one case is one-third, in another one-sixth.

The last case was one of hydrophthalmia. It was a child nine months of age, whose eye had only increased in size since the fourth month; when it came to the clinic the episcleral vessels were injected, the cornea infiltrated and very nebulous at the center; treatment with phosphate of lime and pilocarpine cleared up the pupil and brought about a certain diminution in the volume of the eye. At the age of fifteen months the child was brought back to the clinic and the eye found to be still large. De Vincentiis' operation was performed. The porcelain tint of the cornea was effaced and the volume of the globe diminished. At the age of eighteen months a second loosening of the angle, this time below, with Von Graefe's knife; no change. One month afterward another operation with Valude's knife; an incision in the superior semicircle of the chamber. The sight was improved and the volume of the eye reduced. For the past month retrogression has been arrested and instillations of pilocarpine were made and treatment with glycero-phosphate of lime.

Indications for incision of the angle of the iris.—Indications for the operation can be only incomplete and provisional, the operation being known only for a few years and the number of cases published being limited. It is principally from the indications furnished by the Italian oculists that we are able to advance any ideas.

The operation properly performed is very harmless. It has for a lesion a puncture wholly in the cornea; for its field of action, a part of the circle of tissue of infiltration.

The advantages are that there is but a single and narrow opening, that the aqueous humor remains in the anterior chamber during the incision, that after the operation the

liquid escapes gently and the tension subsides by imperceptible degrees.

The opening being closed by the blade, the aqueous humor cannot escape and is sufficient to hold the iris away from the cornea, permitting the introduction of the instrument into the angle and the breaking up of the adhesions. If after a few days the results are not sufficient, there remains the resource of making an incision in the opposite semicircle. In withdrawing the instrument, neither prolapse of the iris, nor entanglement in the opening that would be made by using the needle, is to be feared. The tension diminishing, we have still less, than in the classical operation of De Wecker, to fear hemorrhage in the eye from degenerated vessels, nor any apprehension of luxations of the crystalline from rupture of the zonule, as has been seen in iridectomy.

The cure of acute glaucoma remains the task of iridectomy. If accidents occur and menace the vitality of the eye, one could not counsel any other operation than that of Von Graefe, the excellent results of which have received numerous demonstrations.

Meanwhile, to avoid attachment of the iris if the tension of the globe is too great, M. de Wecker advises that Von Graefe's operation be preceded by a sclerotomy, in which the flaps generally close without adhesions to the uveal tract. There is still less fear of the production of a cystoid cicatrix at the corner of such a narrow wound as that made in the border by the special instruments.

The loosening operation serves better than the classical sclerotomy as a *preparatory operation, an auxiliary to iridectomy*, in certain forms of glaucoma.

In *prodromic glaucoma*, if myotics seem to have lost their action, before opening the anterior chamber largely and making a breach in the iris, we should always try to prevent a return of the painful attack by an operation which, when well managed, leaves nothing behind it but a simple puncture of the border. If this attempt is successful, coloboma of the iris and the constrained vision that results

from it will have been avoided, without counting the fact that there is always fear of seeing a cystoid cicatrix established after an iridectomy, however well it may be performed.

According to the statistics of Taylor and the observations made by Sgrosso, the De Vincentiis operation will rapidly restore the visual acuteness and arrest the retraction of the visual field in *irritative and chronic glaucoma* and in *simple chronic glaucoma*; M. Sgrosso * goes as far to say that, in one case of simple chronic glaucoma, he has seen the incision of the angle followed by a disappearance of the papillary excavation.

It seems, on the whole, that one can only leave the advantages of sclerotomy and in preference practice incision of the angle, an operation that leaves only an insignificant wound.

In the hemorrhagic forms of glaucoma, the leaving off of a shred of the iris gives rise to the danger of sanguineous effusions, to detachment of the retina and of the choroid, and to the sudden outflow of the vitreous. The incision produces a contraction; the chance may always be taken of causing a cessation of the violent pains, before deciding upon enucleation, which is a last resort.

Finally hydrophthalmia. Here iridectomy is recognized as difficult and is not often followed by amelioration. Tonics, pilocarpine, and hot compresses tend perhaps to disperse the corneal infiltration, but do not reduce the globe.

We cannot do better than to repeat what M. de Wecker has written upon this subject: "In infantile glaucoma or buphthalmia there is every advantage to restrict to a minimum the opening made in the ocular globe, especially in very young infants. It is well in these cases to avoid one other danger, not to incise the sclerotic—which is very thin in these subjects—too deeply, in order to avoid the danger of abundant intra-ocular hemorrhage which often, it is true, occurs spontaneously and leads to

* *Compte rendu de la 14e session de la Société italienne d'Ophthalmologie du 26-29 avril, 1895.—Annales d'oculistique, CXIV, p. 291.*

destruction of the organ. Thus Taylor reports a case of buphthalmia operated by M. de Vincentiis where an abundant intra-ocular hemorrhage led our confrère, on the following day (*il giorno seguente*), to proceed to enucleation. I have also had a similar case, but the easy evacuation of the blood, six days after, gave an excellent result. It is then useful to make the incision less extensive the younger the patient; further than this, in repeating the operation, the incision should be carried throughout the whole circumference of the angle of the iris.”*

We are great partisans of an operation that does not seem at all dangerous. In the case cited in this article, three successive incisions were made in the sclero-corneal tissue of one eye, and each time the globe was going into relapse. But the action of each incision did not seem to follow inside of a month.

Let us mention, finally, that M. de Wecker† hopes to obtain benefit from internal sclerotomy in cases of *progressive myopia*, where the condition is no longer amenable to hygiene nor to glasses, and, by raising it above 20 diopeters, menaces the rapid suppression of the rest of vision by producing a detachment of the retina.

Operative complications.—The complications which may present themselves in the course of an operation are very slight when compared with the satisfaction that is felt when the symptoms of glaucoma recede under the influence of so benign an intervention.

The blade may cut the sclerotic entirely; but is this a complication, since subconjunctival sclerotomy was a proceeding recommended by Spencer Watson? The iris may give way at the base; but iridodialysis is an operative lesion advised by certain authors to re-establish the function of the iritic angle, and Bowman insists upon the advantage of tearing away some fragments at the base in iridectomy. As to the amount of blood which escapes into the chamber when the point intersects the vessels of the ciliary

* L. de Wecker.—*Annales d'Oculistique*, 1895, p. 108.

† *Idem*, p. 109.

process, it is not sufficiently abundant in most cases to cause disorders of the rest of the globe, and, when the swelling is reduced, the blood is usually reabsorbed. Finally, as for the rents made around the pupil by tearing with the point of the needle or abrasion with the edge of the knife, they do not seem to affect the vision; patients returning to the clinic long afterward do not complain.

In a future article we will consider the anatomical results of our researches upon the incision of the angle of the iris.

ABSTRACTS FROM CURRENT LITERATURE.

Shearer, T. L.—**The Significance of Pain in the Pharyngo-Laryngeal Region.**—*Hom. Eye, Ear and Thr. Jour.*, March, 1898.

By the term pain is here meant any unnatural sensation, from the mildest to the severest degree. Subject may be considered under the following heads :

- I. Pain caused by the presence of foreign bodies.
 - II. Painful sensations due to neuroses.
 - III. Pain produced by local rheumatic conditions.
 - IV. Pain caused by acute catarrhal conditions of the pharyngo-laryngeal mucous membrane, with or without œdema.
 - V. Pain produced by changes in or inflammatory states of the lymphoid structures.
 - VI. Pain referable to organic changes, such as malignant disease, tuberculosis, and syphilis.
 - VII. Pain resulting from inflammatory enlargements of the cervical lymphatics.
 - VIII. Pain due to the development of angina ludovici.
- (1) We cannot always tell from the pain the position of the corpora adventitia. (2) Of this are three subdivisions : (a) hyper-æsthesia will often occur in persons very healthy otherwise, except for inflammations of the throat ; (b) those that are of hysterical origin *e. g.*, hair or splinter. It should be borne in mind that hair sensation is symptom of hypertrophy of lingual tonsil ; also splinter is one of subacute and follicular pharyngitis ; (c) neuralgia is either wave-like in character, or shooting and stabbing. (3) (a) Cases aggravated by quietude and “limbered up” by motion, and (b) those worse when swallowing, especially fluids or saliva. (4) So well known they need no explanation. (5) (a) Acute tonsillitis—either lacunar or parenchymatous ; (b) peritonsillar abscess or true quinsy ; (c) acute inflammation of the lingual tonsil ; (d)

chronic follicular pharyngitis ; (e) Retro-pharyngeal abscess. (6) Here the symptom by which we may differentiate these three conditions is well given—the pain is severest in tuberculosis of the pharynx, next in carcinoma, and least in syphilis. (7) These may be caused by syphilis, tuberculosis, carcinoma, sarcoma, scarlet fever, measles, diphtheria, irritation from the teeth, or by a severe cold. (8) The characteristic features of this are : (a) “A peculiar wooden induration of the tissues, not receiving impressions ; (b) a uniform spread of this induration in such a way that it is always sharply bordered by a zone of entirely unaffected cellular tissue ; (c) a hard sublingual swelling, with a bolster-like mass around the interior of the lower jaw, of a deep-red or bluish-red color. Forty per cent. of all the cases occurred between the ages of twenty and forty years.”

Other conditions, *e. g.*, certain forms of cardiac disease, may cause pain in this region ; but their cause is so foreign, and they are accompanied by such characteristic signs, they could not be considered in paper of this scope.

PALMER.

Collins, E. Treacher.—Cases in which Foreign Bodies were Localized in the Eye by Means of the X-Rays, and afterward Removed with the Electro-Magnet.—*British Med. Jour.*, August 20, 1898.

These cases illustrate the value of the Roentgen ray in ophthalmology. Case III. is interesting in the fact that the foreign body remained quiescent in the eye for fifteen years. Inflammation then ensued, which at once subsided on the removal of the foreign body.

CASE I.—J. A. was admitted to the Moorfields Hospital on February 16 of this year, under Mr. Tay, who kindly permitted me to take charge of the case.

History.—On October 10, 1897, four months previously, while using a chisel, he was struck on his left eye with a piece of steel. He did not see the piece that struck him fall down again, and thinks it must have remained in his eye. For about a week after the injury the eye was inflamed and painful—gradually “a film grew over the sight.” At the end of a week he was only able to distinguish light from dark with it. The inflammation then subsided, and the eye remained quiet until a week before Christmas, when it again became red and painful, and has

continued to be so, on and off, at short intervals ever since. His right eye has recently become slightly intolerant to light.

Condition on Admission.—Mr. Maclellan, the house-surgeon, noted as follows: As to the left eye, marked ciliary injection; small transverse scar in outer half of the cornea on a level with the lower margin of the pupil. Anterior chamber of good depth. Iris slightly discolored, small reddish stained area in its outer half behind the corneal scar. Pupil contracted, reacting only sluggishly to light. Lens opaque throughout; V. = Counting fingers at six inches; projection of light good. T. n.

Localization.—Dr. Mackenzie Davidson examined the patient with the X-rays, and localized a chip of metal as situated 3 mm. external to a piece of lead wire previously fixed to the lower lid, 7 mm. upward from it and 4 mm. backward. On working this out, it led to the conclusion that the foreign body was in the lens directly behind the discolored spot in the iris.

Operation.—On February 21, the patient being under ether, I performed an iridectomy upward and outward, inserted the terminal of an electro-magnet into the lens in the direction in which the foreign body had been ascertained to lie, and at once withdrew a chip of steel. The opaque lens matter, which was very soft, was then extracted.

Result.—The wound healed rapidly, and on March 7, a fortnight after the operation, when the patient left the hospital, the following note was made: Eye quiet, angles of iris in good position, very little lens matter left. V. = c + $10\frac{6}{10}$ c + 14 J. 15 slowly.

A month later the sight had somewhat improved. There was still, however, a membrane in the pupil which, if needled, would probably allow of his obtaining normal vision.

CASE II.—A. M., aged twenty-three, was admitted to the Moorfields Hospital on May 9, 1898.

History and Condition on Admission.—Five days previously, while using a hammer and a cold chisel, he received an injury to his left eye. Mr. Maclellan's note of the condition of his left eye on admission was as follows: Much conjunctival and ciliary injection, cornea slightly steamy. Anterior chamber of good depth. Scar of recent wound in sclerotic, a short distance from the inner margin of the cornea. Iris irregularly discolored. Pupil semi-dilated and fixed (from use of atropine). No fundus

reflex can be obtained, but some blood clots can be seen in the vitreous by focal illumination. V. = Hand movement. T. n. Eyeball very painful on pressure.

Localization.—Dr. Mackenzie Davidson, after taking two skiagraphs with ninety seconds' exposure each, diagnosed the presence of a spicule of metal 5 mm. in length, and located its lower end as situated 5 mm. inward and 4 mm. upward from a lead wire pointer placed on the lower lid. These measurements led almost exactly to the scar in the sclerotic. He further estimated that it was lying close behind the ciliary body, so that in this case, before commencing to operate, I knew the exact spot in the sclerotic beneath which the foreign body lay, the depth in the eye at which it was situated, the direction in which it was lying, and its exact size and shape.

Operation.—I planned my incision with a Graefe's knife in such a way as best to facilitate the removal of the foreign body, and on the first introduction of the terminal of the electromagnet at once withdrew it.

Result.—On June 6, twenty-five days after the operation, when the patient left the hospital, the following note was made: Very little injection; cornea bright, pupil dilated regularly. No fundus reflex, only blood clot in vitreous seen; wound healed; no pain. T. n. V. = Hand movement. Right eye healthy. I have seen him from time to time since then. The eye has remained quiet, and the vision has slightly improved. Streaks of blood can still be seen in the vitreous; the tension is slightly minus.

CASE III.—J. K., aged forty-one, came to me as an out-patient in May, this year.

Condition on Admission.—He complained of inflammation and pain of his right eye, which had commenced a few days previously. On examination, there was seen to be a good deal of conjunctival and ciliary injection. The iris was discolored, and the pupil would not fully dilate with atropine. The cornea was clear. In the outer half of the iris a small brown patch was seen, with a central yellow nodule. On questioning the patient as regards injury, he stated that fifteen years ago he was struck in the right eye with a piece of steel, and that he thought the brown spot had been there ever since then.

Localization.—I treated him with hot fomentations and atropine

for about a fortnight, but the inflammation and pain continued unrelieved. I then sent him to Dr. Mackenzie Davidson, who took two excellent skiagraphs, and located a small foreign body in the rounded mass in the outer part of the iris.

Operation.—On June 2 I made an incision at the outer margin of the cornea with a keratome, passed the terminal of the electro-magnet in toward the dark spot in the iris, and at once withdrew a chip of steel measuring 1 mm. by 1.5 mm.

Result.—Four days later the inflammation and pain had so far subsided that the patient was able to leave the hospital, and since then his recovery has been uninterrupted. DEADY.

Richardson, Chas. W.—After-Treatment of Restored Deflected Nasal Septum.—*Annals of Otol., Rhinol. and Lar.*, August, 1898.

After operation usually occur pain (neuralgic), slight rise of temperature, and inflammatory reaction and severe exuberant granulations. He advises that during the fever, generally lasting three days, the patient should maintain recumbent position. Wear the splint ten days, the first seven without removal, cleanse with antiseptic, t. i. d. These procedures, he claims, diminish the above three sequelæ. PALMER.

Ellett, E. C.—Review of Pathological Conditions Affecting the Lingual Tonsil.—*Annals Otol., Rhinol. and Lar.*, August, 1898.

They may be grouped as (1) Acute inflammations, including abscess. (2) Chronic inflammations, including hypertrophy and varix. (3) Specific inflammations. (4) Neoplasms. (1) Symptoms are sensation of lump in throat, desire to swallow, sialorrhœa, inspiratory dyspnœa, cough, and in one peculiar case, that of Villecourts, "cyanosis, heaviness and difficult motion of right arm, obtunded cutaneous sensibility, and diminished electric reaction." In abscess in this region best to open with galvano-cautery on account of proneness to hemorrhage. (2) Are the most common conditions: ætiology, seldom found earlier than twelfth year, mostly between twenty and thirty years; absorption of secretions from the nose, "syphilis, scrofula, rheumatism, and possibly tuberculosis," buccal and dental lesions, "irregular menstruation, uterine disorders, and menopause probably responsible for the pre-

dominance in females." Also highly seasoned food, alcohol, tobacco, exposure, and use of voice. Lewis finds it frequently accompanying goiter. Finally, remote factors are general or local vasomotor paresis, hepatic congestion or cirrhosis, constipation, indigestion, and cardiac disorders. Symptoms are sensation of lump, feeling of constriction at upper border thyroid, reflex cough, constant and ineffectual attempts to clear throat, rapid laryngeal fatigue, and hemorrhage. The constant desire to clear the throat is graphically described by Lennox Browne as "faucial or pharyngeal tenesmus," or "throat piles." Laryngeal vertigo, esophageal spasm, and asthma may be accompaniments. Treatment: local and general, or constitutional. The former by galvano-cautery or guillotine. (3) Are syphilis and tuberculosis, the former not rare among specific lesions of throat; may be chancre or ulceration, the latter very rare. (4) Are very rare—there have been reported: a retention cyst, fibro-sarcoma, and angioma. PALMER.

Jackson, Edward, A. M., M. D.—Glaucoma, and the Influence of Mydriatics and Myotics upon the Glaucomatous Eye.—*American Journal Medical Science*, April, 1898.

In a very interesting article on the above subject the author summarizes his conclusions as follows:

In general, they (mydriatics) should not be applied to eyes that are glaucomatous or upon the verge of glaucoma. In such eyes the dilatation of the pupil they commonly produce is dangerous, and may cause increase of intra-ocular tension, which, if not speedily relieved, will do permanent damage. But the risk of this effect from a mydriatic is not to be guarded against by fixing an age limit before which mydriatics may be considered safe and after which they should not commonly be employed. In the great majority of eyes a mydriatic cannot cause glaucoma at any time of life, while, on the other hand, a few patients are affected with the disease even from childhood. The danger is best guarded against by bearing in mind the symptoms of glaucoma, and always looking for them before ordering a mydriatic, especially by a careful ophthalmoscopic examination.

In very rare cases careful examination may not reveal the imminence of glaucoma, yet when the mydriatic has been used the outbreak may occur. In such a case the usual remedies for

glaucoma should be promptly resorted to. The mydriatic should be stopped and iridectomy strongly urged. With the proper iridectomy promptly done the prognosis for complete permanent cure is excellent, the results being decidedly better than in cases discovered at a later stage when the glaucomatous outbreak has occurred spontaneously. Indeed, if the patient permits the proper, immediate treatment of his case, the fact that an outbreak of glaucoma has been evoked by the use of a mydriatic is probably a cause for congratulation rather than for regret. For the eye was, in all probability, doomed to the disease, and the earlier application of the remedy gives the better chance for complete and permanent cure.

I believe it would be perfectly proper, after explaining the matter to the patient, and getting his assent to prompt iridectomy if it should be indicated, to use homatropine as a test for the presence of glaucoma at the earliest stage in doubtful cases.

If the patient refuses iridectomy, eserine should be promptly resorted to, in such strength and with such frequency as may be necessary for the reduction of the pupil. In the case of a glaucomatous outbreak following the use of a mydriatic more persistent in its action than homatropine, it would be proper to shorten the period of mydriasis by tapping the cornea and evacuating the aqueous humor, preparatory to the efficient use of eserine.

In any case of glaucoma in which the pupil is firmly bound down by adhesions, or is otherwise so fixed that mydriasis cannot cause thickening of the iris opposite Fontana's space at the angle of the anterior chamber, especially if the application of eserine aggravates the symptoms, it is justifiable to apply atropine or some other mydriatic, and in a small proportion of cases such applications will be of marked benefit.

Myotics are beneficial in glaucoma only when the pupil is still movable, that is chiefly in the earlier stages. When not beneficial they are distinctly injurious.

If for any reason iridectomy cannot be done, myotics are always to be tried in the earlier stages of the disease. If they cause marked improvement, they may be continued so long as they cause improvement. If they reduce the eye tension, they may be continued so long as they keep the tension down; if they promptly relieve attacks, they may be continued so long as the

attacks are rendered less severe and frequent, and have no permanent impairment of function, either of central vision or of the field, in the interval. But in the vast majority of cases there will come a time when the influence of the myotic, although still favorable, is less favorable than it has been; and after this it is liable rapidly to lose its power to do any good at all. Hence, whenever this period arrives, the patient should be warned that the myotic is insufficient, practically worthless, and an operation, preferably iridectomy, gives the only chance for escaping complete blindness, and perhaps, intense suffering. DEADY.

Hammond, L. J.—Surgical Treatment of the Sinuses Accessory to the Nose.—*Phil. Polyclinic*, June 11, 1898.

Enumerates the sinuses as four ethmoids (two anterior and two posterior), two sphenoids, two frontals, and two maxillary. Chronic disease most frequently affects the anterior ethmoidal (this also the earliest attacked) (2) the sphenoidal, (3) the sphenoidal, and least often the maxillary. As sphenoidal sinuses seldom develop before puberty, this sinus may be excluded in considering sinusitis occurring before that age. Anosmia, accompanied with the discharge and other usual symptoms, is quite characteristic of trouble in the anterior ethmoidal; because filaments from the olfactory bulb pass through them. On account of the ostium maxillare communicating with the lower or respiratory portion of nares, disease in maxillary antrum seldom causes atrophic or chronic rhinitis. Antrum Highmori is more apt to be involved in the acute inflammation, as cold-taking, dentition, syphilis, and bone lesions, etc. "There are two forms of atrophic changes that take place in the mucous membrane of the nasal cavities and associated sinuses that call for surgical interference, (1) primary atrophy, the result of depraved condition of tissue as seen in the strumous diathesis, (2) that following hypertrophy," which less frequently involves the sinuses primarily. Treatment is purely surgical: considers curettement more easily and thoroughly accomplished with patient in recumbent position, with head hanging over edge of table at about forty-five or fifty degrees. Antrum should be opened through the alveolus over the second bicuspid. After-treatment: cleansing with antiseptic solution twice a day, and the nostril should be closed by sterilized cotton for six days to keep out any contaminating substances. As

sequelæ may have meningitis or inflammation of the brain, but very seldom.

PALMER.

Berger.—**Mixed Tumors of the Soft Palate.**—*Rev. de Chir.*, July, 1897.

In an exhaustive study of these tumors the author presents the following conclusions :

Mixed tumors of the soft palate form a well-defined group, having marked anatomical and clinical characteristics.

These tumors have their origin in the glandular structures of the soft palate; their limits are well marked, and remain so, by an envelope of connective tissue which enfolds and isolates them entirely from neighboring tissues.

They justify the name which has been applied to them of epitheliomata of varying structure. Their composition is the following:

(a) Epithelial elements of which the nature is sometimes similar to that of adenomata, sometimes, and more often, that of epitheliomata.

(b) A connective-tissue web in which are found the various forms of connective tissues, principally that of mucous and cartilaginous tissue. The cases observed by the author are contrary to the theory of an endothelial origin of these tumors.

From the clinical standpoint these tumors are essentially benign; they have never, in the author's experience, presented the progress and termination of true epithelioma. This benignity seems to be due to the strangulation of the epithelial tissue of the tumor by the mucous or cartilaginous structure of the framework.

These mixed tumors of the soft palate are nevertheless difficult to distinguish from sarcomata, which, in this region, may present analogous characteristics—slow development, a very well-marked encapsulement, and a relative benignity.

The gradual growth of these tumors is their sole source of danger, injuring the function of neighboring organs by the compression which they exercise. The prolongations which they send out into the pharynx and the pterygo-maxillary and parotid regions render their enucleation more difficult. This, however, can be accomplished through the help of the capsule which surrounds them. Recurrences are always due to the incomplete removal.

Other tumors of the soft palate often occur which present a marked analogy to these mixed tumors. But these tumors perforate the palate and invade nasal fossæ and maxillary sinuses.

They are less sharply defined than these tumors of the soft palate. Though some of them apparently arise from the palatine glands, and present the same texture as the mixed tumors, there are others which belong to the sarcomata, particularly the plexiform sarcomata and the angio-sarcomata.

These tumors of the palatine arch must not be confounded with the tumors of the soft palate. Their anatomical study demands new research. The diagnosis of their various forms cannot be established in a precise manner. Their prognosis should be much more reserved than in the mixed tumors.

DEADY.

Foster, R. W.—Fucus Vesiculosis in Goiter.—*The Am. Hom.*, May 2, 1898.

Goiter occurring in persons under thirty years of age is amenable to this remedy ; after that age it seems to lose its efficacy. In patients under ten years, dose one teaspoonful ; between ten and twenty years, two teaspoonfuls ; and three over twenty years æt. It requires from 6 to 18 months to effect a cure ; the younger the patient, the quicker the cure.

PALMER.

Darnell, Wm. Edgar.—The Medicine of Superstition.—*International Medical Magazine*, July, 1898.

From an article reciting many valuable (?) methods of treatment for various affections, as formerly recommended by medical authorities (*sic*), we select the following, as being of special interest to our readers:

“The hare’s gall mingled with honey brighteneth the eyes, and an ointment made from a wolf’s eye, was the best prescription of the ancient Saxon oculist. The cure for sore eyes is to lick the eyes of a live frog. As a preventive of sore eyes we are told by Marcellus that when a shooting star is seen, as many numbers as possible should be counted, for as many years as you count numbers you will avoid inflamed eyes.

“The Saxons used the juice of an emmet’s egg, or the gall of a goat, for deafness. Extreme cases were cured by a mixture of equal parts of boar’s gall, buck’s gall, bull’s gall, and honey.

One prescription directs that the bowels of an earwig be powdered with the smede of whatever meal and the netherward part of Marche, and mingled with honey.

"For goiter, oil from a lamp that has burned by a death bed may be rubbed on the swelling, but in some parts of Britain the horrible charm of having the hand of a dead child rubbed nine times across the goiter, must be undergone. It is even better if it be the hand of a suicide.

"Mr. Gordon Cummings relates a case which occurred not many years ago, in which a poor woman living near Hartlepool, acting on the advice of a wise woman, went alone by night to an outhouse where lay the corpse of a suicide awaiting the coroner's inquest. She lay all night with the cold hand of the corpse resting on her, but the mental shock of such a night of horror was so great that she shortly after died, before it could be determined whether the treatment would have been successful or not."

DEADY.

Mills, W. S.—*Climate as a Remedy for Consumption, with Special Notes on the Climates of New Mexico and Texas.*—*N. Am. Jour. Hom.*, May and June, 1898.

No positive rule can be formulated as to a particular climate for all cases, each case must be a law unto itself. Purity of the air is first in importance. The general climatic indications are "first, the patient should live where the conditions are such that he can spend the greatest number of hours in the open air; second, he should live where he could find the greatest amount of sunshine." Altitude is not necessary *per se*, only necessitating fuller inspiration. "Patients with recent hemorrhage," going to a higher altitude "should wait at least two weeks," after such "before starting," and then should ascend *gradually*, stopping a day or two at different altitudes *en route*. Continued uninterrupted residence at a high altitude over-stimulates the nervous system, causing a "nervous wreck"; another bad effect is said to be emphysema.

"To recapitulate—In selecting a climate for the consumptive the first and most important consideration is pure air; second, if the patient is not of a nervous temperament, and if his heart and blood vessels are in good condition, some considerable altitude may for a time be beneficial; third, other things being equal, a

place with a dry atmosphere is probably preferable to one that is damp. Equability of temperature, as generally understood, I eliminate altogether." We too frequently forget that the patient should not only have the necessities, but the conveniences and luxuries of life. If possible also keep them from the constant company of other "one-lungers," as expatiating upon their ailments is very depressing. The immediate hygienic surroundings are very important. "Two years is the minimum length of time recommended." "It is the very hot, extremely dry air, breathed in day after day, that helps most rapidly to heal the diseased lung tissue." In returning home they should descend the mountains by easy stages.

The Climate of New Mexico.—Albuquerque, the largest city in the state, is on the Rio Grande, five thousand feet above sea level, surrounded by plateaus and mountains far higher still. The air is beautifully clear, dry, and bracing. Nights always cool. Dews are unknown, and fogs are almost unheard of. Average of twenty-two cloudless days in a month, and only two when sun obscured more than half a day. Hotel accommodation fair, boarding-house better, and housekeeping best. Markets contain great variety. Heat prostrations never occur.

Santa Fé is a smaller older-fashioned town and interesting as such. Has an elevation of seven thousand feet and surrounded on three sides by mountains and in immediate vicinity by a plentiful growth of stunted pines. The average daily range of temperature is the least in New Mexico. The precipitation or rainfall is about double that of Albuquerque. "Local physicians told me that cases of fibroid phthisis did especially well at Santa Fé." Hotel accommodations are the best in the Territory.

Las Vegas is situated in open country, at an altitude of sixty-five hundred feet, mountains only on one side. It has a greater range of temperature and greater precipitation. It has the advantage of the Las Vegas Hot Spring in its vicinity. Albuquerque is the most desirable spot of all.

The Climates of Texas.—This covers such a vast area (sixty thousand square miles more than France) it has four climates. That of "1st. The extreme western portion, with its high altitude and small amount of rainfall; 2d. The central prairie region; running north and south through the whole length of the State; 3d. The eastern woodland, extending from the northern border

to the coast ; and 4th, The coast region." In the first division is El Paso, located in Rio Grande valley, thirty-eight hundred feet altitude ; the climatic condition is very similar to Albuquerque except altitude, and it is much warmer. In the second division at altitude of from three to seven hundred feet are Fort Worth, Dennison, Sherman, Dallas, Waco, Austin, and San Antonio. (The last city has such a reputation that we need say nothing in extract.) Waco has the additional advantages of its sunning pool—the largest in the U. S.—at unvarying temperature, summer and winter, of 103° F. In the third division are Texarkana, Marshall, Tyler, Mineola, Palestine, etc., while Houston may be practically included in this. The vast pine forests situated in this division of the State supplement the benefits of other localities, by a balsam-loaded atmosphere, which is the great attraction of the well-known Lakewood, N. J. Finally, as a sample of the fourth division, may be taken Galveston. It is but a few feet above sea-level, atmosphere is moist to point of saturation, therefore too damp for consumptives ; but on account of its "low altitude, dampness, and great amount of sunshine," it is a desirable resort for nervous people.

PALMER.

Garel, J.—Evidences of Syphilis.—*Semaine Méd.*, July 6.

The author affirms that a persistent dysphagia of three weeks' duration or more, without other symptoms, is sufficient on which to diagnose a case as syphilis. There are a few but very rare exceptions, *e. g.*, incipient cancer and tuberculosis. If specific, the administration of the iodides for three days will cure it.

PALMER.

Kranz-Busch.—Rhino-scleroma Cured by Aurantium Chloratum.—*Per The Am. Hom. Jour.*, June 15, 1898.

Commenced in third month of first pregnancy, it was at stand-still between pregnancies, increasing during first three pregnancies. No syphilitic history. There was "a slowly increasing darkness and discoloration of the right" side ; latter left, size of three penny pieces, "point now became flatter, the alæ broad and immovable," "left-side, septum copper-color, hard lump." These were curetted and cauterized with lactic acid, but returned "on the lateral aspect of nose, on the alæ nasi and septum ; there are copper-colored, elastic, shining indurations," painless, movable,

with skin which is normal in immediate vicinity. Six years after beginning, during fourth pregnancy, came under Dr. Kranz' (Sr.) care. There was *no* increase during this or in the fifth or sixth, and gradually disappeared in something over three or four years. Remedy given in 5x strength. PALMER.

Jonas, A. T.—Removal of Epitheliomatous Tonsil, by the External Route (Pharyngotomy), with a Report of Two Successful Cases.—*Jour. of Am. Med. Assoc.*, August 13, 1898.

(We merely give description of operations). CASE I.—Tumor, "size of hickory nut beneath and slightly posterior to the angle of the right lower jaw." "A triangular flap was reflected forward, the lines of incision extending along the lower margin of the lower jaw, beginning about midway on the horizontal ramus and extending to the mastoid process, and thence downward along the anterior margin of the sterno-cleido-mastoid muscle to a point opposite the cricoid cartilage; the submaxillary and superior carotid triangles were exposed." "The affected gland was situated in the submaxillary triangle; by means of blunt dissectors the surrounding structures were separated without much hemorrhage. The sterno-mastoid, together with the carotid artery, the internal jugular vein, and pneumogastric nerve were retracted posteriorly with blunt hooks. The digastric, mylohyoid, and hyoglossus were likewise retracted. The tongue now became unmanageable, interfering with respiration, so it was drawn forward and held by means of a vulsellum forceps. The left index finger was now introduced into the mouth and pressure made outward against the tonsil. The head was drawn strongly to the left side and by means of a blunt dissector the tonsil was gradually separated, the growth removed. The pharynx and larynx could now be inspected. With curved scissors and pincette; the ragged margins of the wound were trimmed. No blood seemed to have entered the larynx. The pillars of the fauces were drawn together with catgut and the external wound closed with deep interrupted silk sutures. No drain." Healing process uneventful. Fed by stomach tube two weeks. Patient alive now, four years after operation.

CASE II.—"Immediately beneath the horizontal ramus of the jaw, at its angle and extending forward one-third its length, a hard

ovoid mass, size of an English walnut, immediately adherent to the soft sublingual gland. Below this mass could be felt the hazel-nut-sized nodules." To control tongue it was transfixed by strong silk suture. Incision made as above and flap reflected. "The external jugular vein was ligatured between two ligatures and divided. On palpation a number of distinctly infiltrated glands were felt beneath the sterno-mastoid. This muscle was divided diagonally and its ends reflected, giving easy access to the involved structures. By blunt dissection it was found that the glandular enlargements were intimately and firmly attached to the internal jugular and both internal and external carotids. The pneumogastric nerve was isolated and the vein and arteries ligated, greatly facilitating the extirpation of all nodes, together with the sublingual gland, which was plainly involved. After an exact hemostasis, the head was drawn toward the right, the tonsillar mass was seized from the wound with a four-pronged vulsellum forceps, and pressure from the throat outward with the index finger of an assistant; the pharynx was opened with curved scissors and the mass rapidly clipped away. It was now possible to inspect the pharynx, and several remaining masses were easily clipped away." Hemorrhage slight. "No blood had entered the larynx." After flushing and swabbing an unsuccessful attempt was made to approximate the buccal and pharyngeal mucous membranes with catgut. Deep structures coaptated with same material and integument with subcutaneous silkworm gut. "A gauze drain was placed in the lower angle of the wound." Primary union, except site of drain. Feeding per stomach tube was continued six weeks on account of a sinus forming, connecting pharynx with external neck. Fistula gradually closed and pharyngeal wound slowly healed. Had severe laryngeal spasm from insufflation of mucus. On third day suddenly attacked with total blindness of left eye—choked optic disk found—probably from embolus or thrombus of central retinal and postciliary arteries.

PALMER.

Hepar Sulphur in "Colds."—*Hom. Eye, Ear and Thr. Jour.*, July, 1898.

"It is useful in that catarrh when there is aching all over the body. It should be here placed, not as a remedy useful in the incipency, but for the advanced stage of 'cold.' If it be given

at the commencement, it frequently spoils the case, whether it be one of coryza or sore throat, because it is more suitable to what has been termed 'a ripened cold'—when phlegm has formed. Swallowing produces the sensation of something sharp in the throat; it is often likened to a bone. Again it will seem as if it were a crust of bread." Compare mercurius, nitric ac., arg. nit., and alumina. Hepar colds are re-excited by least exposure. Hepar is further indicated where merc. has been abused.

PALMER.

Juler, Henry E.—Gumma of the Ciliary Body.—*Brit. Med. Jour.*, August 20, 1898.

The result in the following case seems to be remarkably favorable for this severe disease:

A young man-servant, who had acquired syphilis of a severe type, was admitted into the male Lock Hospital with rupial sores only two months after the development of the chancre. A fortnight later iritis showed itself, first in one eye, then in the other, which did not yield to treatment, but passed from the simple into the more serious form known as iritis gummosa. At this stage he was transferred to Mr. Juler's care.

Though under antisymphilitic treatment and atropine, his eyes passed from bad to worse, and eventually a ciliary staphyloma developed in his left eye to the outer side of the cornea. Much lymph was present in the anterior chambers of both eyes, preventing a view of any growth behind the pupil. The anterior chamber was shallow at the site of the staphyloma, which suggested a tumor of the ciliary body. The tension was slightly subnormal (T-1) in both eyes. The staphyloma increased in size, and the recovery of sight in the left eye seemed hopeless; at this time a staphyloma appeared immediately above the cornea of his right eye. His vision was now reduced to perception of light only. Mercury, which had been temporarily stopped, was again given internally, and also by inunctions. Effusion into his left knee-joint, double orchitis, and a gumma on his right fibula appeared while the staphyloma was at its worst; also at this time, which seemed to be the height of the disease, he had an intermittent temperature. From this period onward all the specific lesions began to disappear under mercury and increasing doses of potassium iodide. The staphyloma in the right eye disappeared

first within three weeks of its appearance ; it never reached the dimensions of that in the left. After it had gone it was noticed that the iris had been drawn up, giving the appearance of an upward coloboma. There were extensive synechiæ, and the pupillary area and the coloboma contained an organized inflammatory membrane. The vision in this eye, however, appeared to be the better.

The staphyloma in the left eye took many weeks to disappear, and even three months after the swelling had subsided there was seen a blue discoloration of the sclera. The lymph in the pupillary area became absorbed, and the iris at the outer part was drawn into the ciliary region, presenting the appearance of an outward and downward iridectomy. Ophthalmoscopic examination revealed at the extreme outer periphery a large tract of choroidal atrophy immediately behind the coloboma. In both eyes the effect of the growth was to drag by cicatricial contraction the iris into the ciliary region, and also to produce an alteration in the curvature of the cornea. The correcting lens for the right eye was + 2.5 D. cyl. axis horizontal, and that for the left eye + 5 D. cyl. axis 55° or 35° out of the vertical. There was every reason to believe that he had no astigmatism in his eyes before the attack, and this, coupled with the fact that the astigmatism was greater in the eye with the larger gumma, and that the curvature of the cornea was in each case least in the meridian of the growth, was, Mr. Juler thought, strong evidence in support of the view he had expressed. The vision in the right eye was $\frac{6}{36}$ Snellen, in the left less than $\frac{6}{60}$ Snellen. With the astigmatism corrected, R. V. = $\frac{6}{24}$, L. V. = $\frac{6}{9}$. DEADY.

Hartridge, Gustavus.—Cysts in the Anterior Chamber.—*British Medical Journal*.

Two cases of this rare affection are reported, as follows :

A woman aged thirty-two years attended in August, 1896, suffering from catarrhal conjunctivitis. The left eye at once attracted attention. In the anterior chamber was to be seen a small cyst-like formation, with dark-colored walls about the size of a large shot ; it was quite unattached, and moved to the lower part of the anterior chamber in whatever position the head was placed. The iris acted well. Vision in each eye = $\frac{6}{6}$ and

Jaeger's test-types No. 1. The fundus was normal. The patient had never had any accident to the eye, and remarked that it had always been the same ; she volunteered the statement that she had a son aged ten years whose left eye was exactly the same as her own, the defect being observed soon after his birth. At my request she brought him on her next visit. The boy, who was a healthy-looking lad, presented in the left eye the same condition as his mother, only the cyst was slightly larger and a shade darker in color. The globular body moved quite freely in the anterior chamber ; there were some remains of a pupillary membrane in this eye, but in other respects his eyes were normal. In May, 1890, I showed a similar case at the Ophthalmological Society, and the record is to be found in the tenth volume of the Transactions of that society. These are the only cases with which I am acquainted.

DEADY.

Woodson, L. G.—Fibromata of Naso-Pharynx, with Report of Case.—*The Lar.*, August, 1898.

Almost exclusively found in males between fifteen and twenty-five years of age. The great mortality in the operations for these growths in former times depended on the then necessary preliminary operations, because they usually attained large size before being recognized. Of the eight cases reported operated upon per oram or narium none died, and of twenty-one in which preliminary operation used five died and one very nearly so from hemorrhage. There are four methods of modern operation: 1st, electrolysis; 2d, injections of escharotics; 3d, galvano-cautery loop; 4th, cold wire *écraseur*. Report of case is given, from which a fibroma, $2\frac{1}{2}$ inches long and $1\frac{3}{4}$ broad at base, was removed; the first time by galvano-cautery loop, which was followed by quite severe hemorrhage ; subsequently removed a regrowth with cold wire *écraseur* with no bleeding. Finally deduces the following conclusions: 1st. There are few, if any, cases of naso-pharyngeal fibromata that cannot be successfully extirpated or destroyed by modern measures without endangering life of the patient. 2d. The mode of operation has little or no influence in preventing the recurrence. 3d. Treatment should only be resorted to when demanded for the relief of urgent symptoms, because the tendency to recurrence is marked during the period of active development ; after adolescence there is not only arrest of development, but

frequently spontaneous absorption takes place, when total extirpation of growth is rarely followed by recurrence. 4th. The great danger to be feared from operation is hemorrhage. 5th. The galvano-cautery loop offers an exceedingly rapid method for removal of these growths; but this advantage is more than counterbalanced by its failure to absolutely prevent serious hemorrhage. 6th. The cold wire *écraseur* is the instrument *par excellence* for this operation. It is bloodless, painless, and easy of manipulation. 7th. Injections of escharotics are objectionable because the density of the growth is so great that a long time is required for the separation of the slough, which not only gives rise to a very disgusting and offensive odor, but is a slow and tedious process.

PALMER.

Hill, J. T.—Unusual Sized Rhinolith Removed with Lithotrite, with Prompt Cessation of Prolonged Disturbances.—*The Lar.*, July, 1898.

Woman, *æt.* sixty years. For twenty-five years had profuse anterior and posterior nasal discharge. Recently tinnitus aurium and deafness of right ear, and headache, especially when lying on *right* side. A rhinolith weighing 275 grains was crushed with ordinary urethral lithotrite and washed out, followed by cessation of *all* symptoms. Calculus extended from within three-fourths of an inch of nostrils to posterior choana, pushing septum toward the left.

PALMER.

Paterson, Donald R.—Supratonsillar Fossa as the Starting Point of Infection.—*The Lar.*, July, 1898.

(The anatomy of these structures was given in extracts of the last number.)

The lymphoid tissue forming the inferior boundary of fossa is softer; in looser connective tissue or stroma crypts or lacunæ (normally) are larger and opening wider, and the surface is extended by finger- or teat-like projections; therefore the lymphoid glands are probably more active in this location, and therefore absorption takes place more freely here. The normal excretions of the follicles may be dammed up in the fossa by obstruction of its outlet, as also food particles may; these disintegrate, and the overactive follicles absorb the toxins from them. Lachrymal tonsillitis following nasal operations (as well as ordinary attacks)

usually commences in the (upper) portion of tonsil; this more probably due to the catching of the nasal discharge following operations in the fossa than the communication through the lymphatic channels from the nares to the tonsil. Experiment was made; free drainage and cleansing of fossa were made previous to operation on nares and no tonsillitis followed. In these same subjects tonsillar sequelæ had manifested themselves after nasal operation.

As peri-tonsillitis occurs in the cellular tissue in contact with this space, it also probably comes from infection from decomposing material in this space. A comparison of the frequency of inflammation of the faucial tonsils with the same of the lingual or Luschka's,—it being so much more so in the former,—the author holds, shows the importance of this fossa, because there is no similar space connected with the other tonsils. "Septic pharyngitis," or hospital sore throat, also commences in the upper part of tonsil. Pharyngo-mycosis and tuberculosis may also start in this space.

PALMER.

Spigelia.—*Hom. Eye, Ear, and Thr. J.*, June, 1898.

S. is one of our best remedies for post-nasal catarrh. There is profuse discharge of mucus that seems to pass off only through the posterior nares.

PALMER.

Mitchell, Alexander Taylor.—A Discussion of the Pathology of Quinine Amaurosis.—*New York Medical Journal*, July 2, 1898.

The author presents a case of the above condition in which the patient, a young woman, was given two hundred and forty grains of quinine in thirty hours, at the end of which period she could only distinguish the presence of a lighted lamp held near the face by its heat, there being absolutely no vision.

The ophthalmoscope showed a reduction of the caliber of the retinal arteries of at least one-half.

After the statement that the usual explanation of quinine amaurosis is spasm of the muscular coat of the arteries, and especially of the vessels supplying the rods and cones, and noting the fact that such a state of spasm cannot be permanent and therefore cannot alone account for the condition as usually presented, the writer offers the following explanation of the pathol-

ogy for consideration, "Granting the absence of inflammation, why is this diminished caliber maintained?"

"When an arteriole responds to the irritation of the vaso-constrictor impulses to its muscular coat, the endothelial cells must necessarily reduce their superficial area. With this condition established, a *vis a tergo* preventing the endothelium from absolute contact, the rapid administration of the irritant, quinine, keeping the contractions at, approximately, near summation, it becomes necessary for the overstimulated tunica media to be re-enforced.

"Irritation, inflammatory causes being absent or non-operative, logically produces proliferation.

"The endothelium being necessarily in extreme, strenuous contraction to its protoplasm's utmost, and being acted upon by the arterial pressure, it, theoretically and practically, does not respond further. The tunica media, being held at or near its summation of impulse, cannot.

"Between these two lies a tissue areolar in structure, and consequently eminently adapted for changing its relation to space, and even more adapted to respond to irritation by proliferation. That the vessel wall does not dilate by reason of its exhausted muscles failing is due, I believe, to the formation of rigid connective tissue from the fixed tissue cells of the subepithelium and elastic lamina. When this is established, the function of the tunica media is gone, and the vessel remains permanently smaller because atrophy follows the supplanting of its contractile function. This theory is additionally supported by the consideration of the fact that all the tissues involved are of mesoblastic origin, and by reason of their well-known metaplasia proliferate their own or other mesoblastic units. The maintenance of a patulous though diminished arteriole, as seen in these cases, without a sign of inflammation, demands such an explanation, and, so far as the writer knows, no other explanation will agree with the observed conditions and with modern pathology."

DEADY.

BOOK REVIEWS.

SYSTEM OF DISEASES OF THE EYE, BY AMERICAN, BRITISH, DUTCH, FRENCH, GERMAN, AND SPANISH AUTHORS. Edited by WM. F. NORRIS, A. M., M. D., and CHARLES A. OLIVER, A. M., M. D., of Philadelphia, Pa., U. S. A. Volume III. Local Diseases, Glaucoma, Wounds and Injuries, Operations. With 50 full-page plates and 186 text illustrations. Philadelphia: J. B. Lippincott Co. 1898. Pp. xii, 962.

The present volume of this excellent work is equally able with those that preceded it, which is sufficient praise. Among the prominent contributors are Dr. Herman Knapp on Operations, Dr. Bull on Diseases of the Orbit, Dr. W. A. Brailey on Diseases of the Iris and Ciliary Body, Isidor Schnabel, Professor of Ophthalmology, University of Vienna, on Staphyloma Posticum and its Relations to Myopia; Swan M. Burnett on Conjunctiva and Sclera; Joseph Schöbl of the University of Prague on the Retina; Priestly Smith on Glaucoma, and a number of others whose names are a sufficient guarantee of the value of their work.

To many readers, among whom may be included the writer, the division on operations, by Dr. Knapp, will be one of the most interesting portions of the work. To those who have personally witnessed Dr. Knapp's operations, and who know of the extreme care with which he studies every detail, his personal observations on this subject are of great value, and to have them collected in one place, where they can be easily referred to, is alone worth many times the cost of the entire system. His vast and most successful experience in the line of cataract extraction renders his opinions on the subject of the first importance, and he has given in these pages every step of his method of operating most minutely, with the reason why he considers it the best, and the personal statistics upon which he bases his conclusions.

Professor Schöbl's presentation of diseases of the retina, taken as a whole, is the best and most exhaustive with which we are

acquainted, certainly superior to anything to be found in English in any single work. He considers all the known variations from the normal, and devotes considerable space to many varieties of disease which are only touched on in other works or even omitted altogether. The sections on detachment and glioma are exhaustive and the whole is excellent.

Dr. Theobald is the author of the section on diseases of the lachrymal apparatus, and gives free expression to his theories on the use of large probes, a point where we fail to follow him.

On page 168 he says, "To promote the more rapid absorption of lachrymal strictures, the employment of electrolysis has been suggested. This method of treatment, however, has never been generally adopted; perhaps has not received the consideration which it deserves." In the experience of the writer the use of electrolysis, through the medium of the probe passed through the dilated (not slit) punctum and canaliculus, has given much better results, both immediate and remote, than any other means, with the added recommendation that the function of the sphincter muscle is preserved; a very desirable condition.

Dr. Bull furnishes an excellent description of diseases of the orbit, including diseases of the frontal sinuses. In speaking of tumors, he reiterates his now generally accepted statement that "except in the case of encapsulated tumors of the orbit, surgical interference is almost invariably followed by a return of the tumors . . . with each succeeding operation the period of quiescence grows shorter and the rapidity of the growth increases . . . undoubtedly shortening the life of the patient."

In the article on trachoma Dr. Burnett fails to give any prominence to the treatment by means of the bichloride of mercury, devoting only two lines to a method which has been found in the New York Ophthalmic Hospital to be more generally successful than any other, *i. e.*, rubbing a solution of the strength of $\frac{1}{3000}$ or $\frac{1}{10000}$ into the affected conjunctiva. This has seldom been followed by any notable reaction and has accomplished very desirable results.

An excellent chapter on glaucoma is contributed by Priestly Smith, which presents his well-known theories respecting the pathology of this disease.

It is impossible in a limited space to even touch upon many of the valuable articles contained in this volume. Those who have

read Volumes I. and II. will find this equally indispensable, and no physician interested in diseases of the eye can afford to be without the entire work.

ATLAS AND ABSTRACT OF THE DISEASES OF THE LARYNX. By DR. L. GRÜNWALD of Munich. Authorized Translation from the German. Edited by CHAS. P. GRAYSON, M. D., Lecturer in Laryngology and Rhinology in the University of Pennsylvania; Physician-in-Charge of the Throat and Nose Department, Hospital of the University of Pennsylvania. With 107 Colored Figures on 44 Plates. Philadelphia: W. P. Saunders, 92½ Walnut Street. 1898. \$2.50.

As the title implies, it is a pictorial or objective study of laryngeal maladies. These figures are very true representations not only of almost every pathological condition which affects the larynx, but of a few slightly peculiar larynges. The coloring, which is so frequently poorly executed, is accomplished in a masterly manner. The plates are the production of Aust. v. F. Reichhold, Lith., of München, and are a satisfactory result of indefatigable work, so characteristic of the Germans. Besides these are colorless cuts of larynges, showing the position of the vocal cords while producing different tones, *e. g.*, falsetto voice, ventriloquist's voice, etc., others again depicting clearly the position of the chordæ vocales and adjacent parts in all the paralysees which attack the larynx. Another series represents the microscopic appearance of the sundry growths which are found in the larynx. The figures are actual pictures of some particular case taken from the extensive clinics of the author, and not of a typical or perfect representation of a malady which rather exists in the conception or mind of the experienced laryngologist, than in actual practice in the suffering patient. A feature which makes them particularly practical is that each and every figure is accompanied with a clinical history, containing not only the symptoms immediately connected with the larynx, but other concomitant symptoms throughout the body. A short division of the chapter on "Methods of Examination" called "Practical Hints" is by no means insignificant, especially to the younger laryngologist. This book is alike instructive to the student, showing him what he has not yet clinically seen,—the laryngologist, keeping him in mind of conditions rarely seen,—and the instructor, by assisting him in his explanation of cases to the student.

OPHTHALMIC DISEASES AND THERAPEUTICS. By A. B. NORTON, M. D., Professor of Ophthalmology in the College of the New York Ophthalmic Hospital; Surgeon to the New York Ophthalmic Hospital; Visiting Oculist to the Laura Franklin Free Hospital for Children; Ex-President American Homeopathic Ophthalmological, Otological, and Laryngological Society; First Vice-President American Institute of Homeopathy; President Homeopathic Medical Society of the State of New York, etc. With Ninety Illustrations and Eighteen Chromo-Lithographic Figures. Second Edition, Revised and Enlarged. Philadelphia: Boericke & Tafel, 1898. Pp. 627.

In this second edition of his book Dr. Norton presents a work sufficient for the needs of the general practitioner, and particularly for the homeopathic practitioner.

The volume is a great improvement on its predecessor, containing much new matter; largely rewritten as to other matter; touching, if lightly at times, upon every anomalous condition of the visual organs and supplemented by the Ophthalmic Therapeutics formerly published by the late Dr. Geo. S. Norton, the best presentation of the action of drugs in diseases of the eye to be found in any language.

In the present edition will be found chapters on the anomalies of refraction and accommodation, by Dr. Chas. H. Helfrich, which add much to the completeness of the work, and the absence of which was a serious drawback to the first edition.

We are glad to see that among the few text-books on diseases of the eye, even of recent date, which furnish a description of heterophoria, its means of determination and methods of treatment, homeopathy is twice represented, in the work by Dr. Macbride and the present volume. The object of the book as stated in the preface, viz., *conciseness*, has been strictly adhered to throughout; although almost all possible subjects concerning visual disturbances are touched upon, few words are wasted anywhere, while sufficient data are given to bring the matter presented within the easy comprehension of the practicing physician. Many of the methods of treatment long in use among the staff of the New York Ophthalmic Hospital are described, some of which originated in that institution and may not be generally known outside. A number of the more important operations upon the eye and adnexa are introduced, together with their indications, the necessary instruments for their performance and the after-treatment, both medical and surgical.

The book is freely illustrated ; all of the cuts being fair, many good, and a few excellent.

The paper, presswork, and binding are first-rate, the result being a handsome and compact volume.

HAY-FEVER AND ITS SUCCESSFUL TREATMENT. By W. C. HOLLOPETER, A. M., M. D., Clinical Professor of Pediatrics in the Medico-chirurgical College of Philadelphia, etc. P. Blakiston's Sons & Co., Philadelphia, 1898.

The subject is fully treated from the synonyms to the treatment. As this disease is so stubborn to treat, the literature upon it is legion. The author only claims originality in the chapter on treatment. With the method he advocates he claims to have *cured* two hundred cases in his private practice in the last ten years. The point in which his method differs from those usually employed is, first, he does not advocate such thorough surgical measures as are generally practiced, but instead almost exclusively relies upon the thorough cleansing of the Schneiderian and nasopharyngeal membrane with Dobell's solution. As he himself expresses it: "I scrub most carefully every portion of the mucous membrane, being sure to reach between the turbinated bones and all around and over every slight process." With this treatment, the author remarks, "I believe that the curability of the disease cannot be called in question."

A MANUAL OF OTOLGY. By GORHAM BACON, A. M., M. D., Professor of Otology in Cornell University Medical College, New York. With an Introductory Chapter by CLARENCE J. BLAKE, M. D., Professor of Otology in the Harvard Medical School, Boston. In one handsome 12mo volume of 400 pages, with 109 engravings and 1 colored plate. Cloth, \$2.00 *net*. Lea Brothers & Co., Publishers, Philadelphia and New York.

Dr. Bacon has given us a handy little work which contains all the essentials of otology as understood at the present time. His style is easy and readable and, while very concise, he omits nothing of importance. If there be one fault to be mentioned, it is that he takes for granted a little too much previous knowledge on the part of the reader in some respects, but this can hardly be avoided in a text-book covering so much ground in so little space.

He is very decided in his opinions respecting the operations on the drum and ossicles for chronic catarrh of the middle ear, as he

states in italics that these are generally unsuccessful and frequently aggravate the conditions originally present. Respecting the bougie treatment of the eustachian tubes he is scarcely less pessimistic, regarding them as not very promising at the best.

Over seventy-five pages are given to diseases of the mastoid process and intracranial complications, which are well handled and freely illustrated by excellent plates. The book throughout bears the impress of the author's individuality, and his personal experience has been largely drawn upon for material. It is compact, practical, easy of reference, and should prove very useful to the student in this line of work. It is well printed, neatly bound, and altogether a handsome little volume.

ELECTRICITY IN THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE NOSE, THROAT, AND EAR. With 161 illustrations. By W. SCHEPPEGRELL, A. M., M. D., Ex-Vice-President Am. Laryng., Rhinolog. and Otol. Soc.; Vice-President New Orleans Electric Soc.; Co-editor *Annals of Otol., Rhinol., and Laryng.*, etc., etc. New Orleans, La.: G. P. Putnam's Sons. 1898.

This is a well-printed and neatly bound book of four hundred pages, comprising a thorough compend of all our knowledge regarding the electrical treatment of the different diseases of the upper respiratory passages and auditory apparatus. Preceding the special consideration of the use of a certain form of the electric current is a concise but quite full chapter on such form of current and the apparatus for generating the same; besides one-fifth of the work treats of the elementary study of electricity, batteries, etc.; for example, the definition, etc., of such terms as "a Watt," "a Joule," "a Farad," "a Coulomb," etc.

Then about forty pages are occupied in enumerating and describing the electrical instruments for the examination of the nose, throat, and ear.

The sundry forms in which it is used in this locality are next treated of, such as electrolysis, cataphoresis, interstitial electrolysis, electro-magnetic apparatus, etc. The main portion of the book gives the individual diseases and the special manner in which any or all of the forms of electricity may be beneficially employed in the treatment thereof; while, lastly, the use of X-rays in these specialties is fully given.

The logical sequence in which the subject is handled—first, elementary electricity; second, the apparatus; third, the special

form of electric activity, and lastly, the diseases with their special treatment—enables a person with but meager knowledge of electricity to become quite proficient in this department from a thorough study of this one book.

So well is it indexed that one can expeditiously find any minor division of the subject which he may wish to peruse.

In closing, I should mention that diseases of the esophagus are included in this volume.

THE REFRACTION OF THE EYE. A Manual for Students and Practitioners. By GUSTAVUS HARTRIDGE, F. R. C. S., Senior Surgeon of the Royal Westminster Ophthalmic Hospital; Ophthalmic Surgeon and Lecturer on Ophthalmic Surgery to the Westminster Hospital; Ophthalmic Surgeon to St. Bartholomew's Hospital, Chatham; Consulting Ophthalmic Surgeon to St. George's Dispensary, Hanover Square, etc. With one hundred and four illustrations, ninth edition. London: J. & A. Churchill, 7 Great Marlborough Street. Philadelphia: P. Blakiston's Son & Co., 1898. Pp., 267. Price \$1.50.

The fact that this little work has already reached a ninth edition speaks for itself, and suggests what we know from experience to be true, *i. e.*, that it is a very useful book with which to begin the study of refraction, and as such we have many times recommended it to intending students.

It contains an outline of physical optics, containing only what is actually necessary to the beginner, a sufficient presentation of the physiological processes resulting in the formation of the picture upon the retina for the purpose in view, followed by the simple and concise discussion of the various forms of ametropia, the best methods for their diagnosis, and the means to be used for their correction. The explanatory illustrations are numerous and well executed and a set of test types will be found at the end. The book is readable, easy of comprehension, sufficiently full for the class for which it is intended, and may be recommended without reserve to students about to take up the subject.

HYGIENE OF THE EYES, WITH SPECIAL REFERENCE TO SCHOOL CHILDREN. By W. E. HATHAWAY, M. D. Cincinnati: Hygienic Publishing Co.

This is a little pamphlet designed to furnish necessary information about vision, and the eyes generally, for the use of school-teachers and others having charge of children.

It aims to present in simple language the dangers incident to improper condition of illumination and faulty methods of study. Explains the connection between errors of refraction and reflex nervous symptoms. Regards kindergartens and school examinations as works of the Evil One (in which there may be more truth than poetry), and in a general way offers many details which should be universally known, but which are so elementary that ordinary works on the subject fail to make a place for them. The leaflet will serve a purpose.

A PRACTICAL TREATISE ON THE SEXUAL DISORDERS OF MEN.
By BUKK G. CARLETON, M. D., Genito-Urinary Surgeon and Specialist to the Metropolitan Hospital and Polyclinic of the Metropolitan Hospital; Consulting Genito-Urinary Surgeon to the Hahnemann Hospital, etc. New York: Boericke, Runyon & Ernesty. 1898. Price \$1.60.

This is a handsome book of 169 pages, written in Dr. Carleton's concise and interesting style and giving the ætiology, pathology, clinical history, diagnosis, prognosis, and treatment of the various sexual disorders in the male.

There are chapters on physiology, prophylaxis, acute and chronic seminal vesiculitis and ampullitis, tubercular seminal vesiculitis and ampullitis, vesicular and ampullar anomalies, cysts, growths, etc., prostatic congestion and prostatitis, hypertrophy of prostate, malignant growths, cysts, calculi, etc., of prostate, priapism, psychical, symptomatic, and organic impotence, derangement of the sexual functions, *psycopathia sexualis*, and sterility. Pages 127 to 159 inclusive are devoted to therapeutics and contain the symptoms of all the remedies bearing on the subject from A to Z. The work should enable the general practitioner to diagnose and intelligently treat the diseases considered.

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